

The Mining Journal

RAILWAY AND COMMERCIAL GAZETTE.

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 748.—Vol. XIX.]

LONDON, SATURDAY, DECEMBER 22, 1849.

[PRICE 6D.]

Contract for Pig-Iron.

DEPARTMENT OF THE STOREKEEPER-GENERAL OF THE NAVY.
SOMERSET-PLACE, DECEMBER 11, 1849.

THE COMMISSIONERS FOR EXECUTING THE OFFICE OF LORD HIGH ADMIRAL OF THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND do hereby give Notice, that, on Thursday, the 27th inst., at One o'clock, they will be ready to TREAT with such persons as may be willing to CONTRACT for SUPPLYING Her Majesty's Dockyard at Woolwich, Chatham, and Portsmouth, with **SOFT MELTING PIG-IRON.**

A distribution of the iron, and a form of the tender, may be seen at the said office. No tender will be received after One o'clock, on the day of treat, nor any notice, unless the party attends, or an agent for him, duly authorised in writing. Every tender must be addressed to the Secretary of the Admiralty, and bear in the left-hand corner the words, "Tender for Iron," and must also be delivered at Somerset-place, accompanied by a letter, signed by a responsible person, engaging to become bound with the person tendering, in the sum of £200, for the due performance of the contract.

Contract for Copper.

DEPARTMENT OF THE STOREKEEPER-GENERAL OF THE NAVY.
SOMERSET-PLACE, DECEMBER 12, 1849.

THE COMMISSIONERS FOR EXECUTING THE OFFICE OF LORD HIGH ADMIRAL OF THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND do hereby give Notice, that, on Thursday, the 27th inst., at One o'clock, they will be ready to TREAT with such persons as may be willing to CONTRACT for SUPPLYING Her Majesty's Dockyard at Chatham with **THREE HUNDRED AND FIFTY TONS OF ENGLISH TOUGH CAKE COPPER.**

150 tons to be delivered by the 31st January, and the remainder by 28th February next. A form of the tender may be seen at the said office. No tender will be received after One o'clock, on the day of treat, nor any notice, unless the party attends, or an agent for him, duly authorised in writing. Every tender must be addressed to the Secretary of the Admiralty, and bear in the left-hand corner the words, "Tender for Copper," and must also be delivered at Somerset-place, accompanied by a letter, signed by two responsible persons, engaging to become bound, with the person tendering, in the sum of £500, for the due performance of the contract.

MINE MATERIALS—DEAN PRIOR AND BUCKFASTLEIGH MINE.

MR. H. C. CREAGH will SELL, BY AUCTION, on the Mine, near the town of BUCKFASTLEIGH, in the county of Devon, on Thursday, the 27th inst., at Eleven o'clock in the forenoon, the whole of the

MACHINERY AND MATERIALS

Belonging to the said mine—consisting of a very superior PUMPING WHEEL, 40 ft. diameter, 3 ft. 6 in. breast, with cast-iron cylinder and centre piece, cranks, brasses, &c., complete; balance bob and connecting iron rod, with brasses and saddles; a machine wheel 24 feet diameter, by 4 feet 7 inches breast, and drum for drawing, with grinders attached, and having cast-iron rolls; a stamping-wheel, 18 feet diameter, 3 feet breast, with four heads of stamps, lifters, frame, &c.; about 60 fathoms cast-iron and wood pumps, varying from 1 inch to 14 inches, with short rods, working barrels, and wind-ropes to match; about 45 fathoms 6-inch wood shaft rods, with strapping plates and bolts to match; about 50 fathoms wrought-iron pumps, rods, &c.; 100 ft. 14 inch, with set-ends and chain for connecting; 200 ft. 10 inch, with two wood cylinders, about 70 ft. 10 inch, with main shaft, 20 ft. 10 inch, with brasses and pivots, about 19 fathoms horizontal rods from 1 1/2 to 2 1/2 inch, with traveller bob, loggerhead, and main sweep rod, with saddles and brasses, shear legs, cast-iron and pulleys, 80 fathoms 6-inch whip-rope, about 100 ditto 4-inch whip chain, with pulleys of different dimensions, miners' and smiths' tools and implements, new and old iron, tools, waggon, dressing sieve and copper bottom, a capital deal, with other valuable materials, and a great number of useful miscellaneous articles.—The mine being situated immediately adjacent to good roads, and only seven miles from water carriage, and less distant to the Totnes Railway station, every facility of easy conveyance therefrom is afforded.

Full particulars and catalogues may be obtained of Mr. Creagh, engineering and land surveyor, Ashburton, Devon; or of Mr. Henry English, 25, Fleet-street, London.
Dated December 14, 1849.

ATMOSPHERIC AND LOCOMOTIVE ENGINES FOR SALE.

MR. STARLING is instructed by the Directors of the LONDON AND BRIGHTON RAILWAY COMPANY to Dispose of those HIGHLY-FINISHED ENGINES, by Messrs. MAUDSLY & Co., lately used on the ATMOSPHERIC RAILWAY.

Mr. S. has also for disposal several new and second-hand SIX and FOUR-WHEELED LOCOMOTIVES—particulars on application at his office, 13, Change-alley, London, November 14, 1849.

EXTENSIVE IRON-WORKS FOR SALE, BY PRIVATE BARGAIN.—The BLAIR IRON-WORKS, belonging to the Ayrshire Iron Company, with the whole MINERAL FIELDS held by the said company, under favourable leases, including the MALLERIE IRON-WORKS, immediately adjoining, so far as erected—all as situated on the great railway of Scotland, and with a large STOCK OF IRONSTONE on the ground, which may be had at a valuation.

For further particulars apply to Mr. Biggart, at the works; Mr. Watson, 22, and Mr. Brown, 25, St. Vincent-place, Glasgow; Messrs. McClelland and McKennie, accountants, there; Messrs. Gibson-Craig, Dalziel, and Brodie, W.S., Edinburgh; or Messrs. Montgomerie and Fleming, writers, Glasgow—the last being in possession of the title deeds and articles of roup.—Glasgow, Dec. 4, 1849.

IMPORTANT TO CAPITALISTS.

VALUABLE SLATE VEIN IN THE MARKET.—The Proprietor of a valuable SLATE VEIN, or BED, covering an area of 63 acres, one-fourth of a mile in width, and rising to an altitude of fully 900 feet (the property of which is freehold), is desirous of obtaining a PURCHASER for the SAME, who will be allowed advantageous terms, with an assured certainty of ample returns, the needful expenditure being carried on extensive operations; and which, from the nature of the slate formation—stratum rising over stratum—ample space (with a deep fall) for rubbish deposit, free drainage, dispensing with the usual adjunct machinery, will not necessarily reach a tenth-part of the average working outlay of the generality of slate quarries. The Slate Vein, to which attention is drawn in this advertisement, is situated on the margin of a navigable lake, in Carnarvonshire, North Wales, within six miles (four of which is the post-road) of an excellent shipping port.

Carnarvonshire is one of the great slate districts of the world, which affords constant and lucrative employment to thousands, at the same time enriching the proprietors. The surveys of three eminent engineers have been followed up by reports of a highly satisfactory character as to the quality and quantity of this eligible slate formation, and may be had, with a view of the plan and sections, on application to Griffith Davies, Esq., Guardian Insurance Office, London; or Mr. W. Dew, surveyor, Llangefni, Anglesea.

ASSAYING AND ANALYSIS.—ASSAYS AND ANALYSES OF MINERALS, METALS, SOILS, FURNACE, and all other MANUFACTURING PRODUCTS. INVENTORS AND INTENDING PATENTEES assisted in PERFECTING any INVENTION involving an intimate knowledge of chemistry. INSTRUCTION in all branches of ASSAYING, ANALYSIS, and METALLURGICAL and MANUFACTURING CHEMISTRY. Communications to be addressed to Mr. Mitchell, 23, Hawley-road, Kentish Town.

STRUVE'S PATENT MINE VENTILATOR.
TO COLLIERY PROPRIETORS.

Quantity of air passed through a Mine almost unlimited, to the extent of 200,000 cubic feet per minute, if necessary—depending on size of apparatus. COST OF AN APPARATUS to produce a ventilation of 20,000 cubic feet per minute, ONE HUNDRED AND FIFTY POUNDS, exclusive of patent right. This amount of ventilation would be sufficient for a mine working 100 tons per day, provided it was not very deep; in which case it would be desirable to provide for 30,000 cubic feet of air per minute. The capabilities of the Ventilator may be doubled at any future time, at a comparatively small cost. The Ventilator has been at work for upwards of six months at the Eaglesham Colliery, near Neath, working under a rarefaction of 24 to 30 inches of water, which demonstrates the impracticability of furnace ventilation, when the shafts are shallow and the airways small.—It is practical to rarify a mine by this ventilator to the extent of 2 feet of water, or 2 inches of mercury.

LICENSES will be GRANTED on application to **MR. WILLIAM PRICE STRUVE**, Swansea, CIVIL ENGINEER AND MINERAL SURVEYOR.

SEWERAGE OF LONDON.—The ATTENTION of the COMMISSIONERS appointed to determine upon the MOST EFFICIENT MATERIAL for the CONSTRUCTION of the SEWERS OF LONDON, is particularly directed to the ASPHALTE OF SEYSEL, which more than any other material is applicable to the CONSTRUCTING and INTERNAL COATING OF BRICK CULVERTS and OTHER CHANNELS for DRAINAGE.

The experiments made by the Royal Artillery on the embankment of Plymouth Citadel, constructed of Seyssel Asphaltic Brickwork, under the orders of the Hon. Board of Ordnance, have fully proved the superiority, adhesiveness, and strength of Seyssel Asphalt over all other contentious compositions. A printed account of these experiments can be had on application to **MR. FARRELL**, Secretary, Seyssel Asphaltic Company.—"Claridge's Patent"—Established 1836.

Note.—The application of the Asphalt of Seyssel is specially recommended by the Commissioners on the Fine Arts for covering the ground line of brickwork in many situations, and it has been suggested that it would be peculiarly applicable for covering the crevices of closed grave yards, and for the construction of catacombs.

BANK OF AUSTRALASIA (Incorporated by Royal Charter, 1835), 8, Austinfriars.—The court of directors GRANT BILLS and LETTERS of CREDIT on the under-mentioned branches—viz.: Sydney, Maitland, Melbourne, Geelong, Hobart Town, Launceston, and Adelaide, on terms which may be learnt on application, either at their offices, 8, Austinfriars, or at their bankers, Messrs. Smith, Payne, and Smiths. By order of the board, **WILLIAM MILLIKEN**, Secretary.

NATIONAL PROVINCIAL BANK OF ENGLAND, 112, Bishopsgate-street, London, Dec. 19, 1849.—The directors of the NATIONAL PROVINCIAL BANK OF ENGLAND hereby give Notice, that a HALF-YEARLY DIVIDEND, at the rate of 6 per cent. per annum, will be PAYABLE on the company's stock on and after the 15th of January next, when the dividend warrants will be obtained at the company's office, 112, Bishopsgate-street, or at the different branches. The transfer books will be closed on and after Wednesday next, the 26th inst., until the dividend becomes payable. By order of the court of directors, **DAN. ROBERTSON**, Agent and Manager.

LOANS ON DEBENTURES.—The CALEDONIAN RAILWAY COMPANY are prepared to RECEIVE TENDERS OF LOANS, in sums not less than £500.—Applications to be made or addressed to this office. By order, **D. RANKINE**, Treasurer. 125, George-street, Edinburgh, Dec. 1, 1849.

RAILWAY CARRIAGE AXLE, LOCOMOTIVE AND MARINE ENGINE BEARINGS, OF STIRLING'S PATENT METAL.—These ALLOYS are found to be SUPERIOR to every other COMPOSITION of METAL for the ABOVE PURPOSES, and are in EXTENSIVE USE on RAILWAYS and in MARINE and GENERAL ENGINES. They do not heat in friction, nor injure the axle or shaft, and they wear much longer, while they are cheaper, and in every respect more economical than any other metals. CASTINGS of all DESCRIPTIONS, for GENERAL MACHINERY, to be obtained of **MEARS AND CO.**, ORDNANCE AND BRASS FOUNDRY AND PATENT METAL WORKS, FIELDGATE-STREET, WHITECHAPEL.

TOUGHENED CAST-IRON—STIRLING'S PATENT
No. 1.—For SMALL and MEDIUM CASTINGS.
No. 2.—For HEAVY CASTINGS.
No. 3 (Extra).—For ROLLS, HEAVY SHAFTS, and VERY HEAVY CASTINGS. The above is by far the strongest Cast-Iron made, and is now being extensively used where strong castings are required. Further particulars may be obtained on application to **MEARS, GARDEN & MACANDREW**, 27, Queen-street, Chichester, from whom also the IRON can be PROCURED.

JOSEPH DEELEY, of the LONDON and NEWPORT IRON-WORKS, NEWPORT, MONMOUTHSHIRE, respectfully recommends to the notice of the public his PATENT FOUNDRY FURNACE, which has been effectually tested, and is now in constant use at the above works, where it may be inspected by all persons interested. This furnace operates without the aid of any motive-power to impel the air. An immense saving is the consequence, both in erecting and working. One-third of the coke usually required is more than sufficient; a loss of only 22 lbs. to the ton being sustained in smelting.

The IRON MELTED in this furnace also undergoes an extraordinary improvement in quality. SCOTCH PIG and SCRAP are returned equal to the best cold-blast in point of strength, and capable of being chipped or filed with the greatest facility. FOUNDRIES USING the FURNACE may exist in the most densely populated cities, without causing the least nuisance—all smoke, dust, and noise being entirely avoided. The FOREMAN'S PATENT RIGHTS of this furnace are FOR DISPOSAL, affording capitalists the most favourable opportunity for profitable investment. APPL. TO THE PATENTEE AS ABOVE.

CWMBRAIN PATENT IRON REFINERY.—The PROPRIETORS of IRON FORGES and SMELLS are respectfully INVITED to MAKE TRIAL of Mr. BLEWITT'S REFINED IRON, or METAL, PREPARED by a NEW PATENT PROCESS, whereby the IRON is completely FREED from the IMPURITIES CONTRACTED in the BLAST-FURNACE, and by judicious mixtures, rendered applicable to every kind of manufacture. Heretofore, the metal usually sold in the market has been produced from her worst pigs, scraps, and refuse of some particular blast-furnace, or set of furnaces, without any mixture, or any regard to quality, or the purposes for which it might be required. The PATENT METAL is PREPARED ON SYSTEM, and TO ORDER, for any of the following purposes:—

1. For BOILER and TANK-PLATES.
2. For TIN-PLATES, commonly called COKE-PLATES.
3. For STRONG CABLE BOLTS, RIVET, and ANGLE IRON.
4. This COMPOUND PUDDLED, beat under the hammer into a bloom, reheated, and rolled into a 6 or 8-inch bar, makes TOPS and BOTTOMS for FLANCH and OTHER RAILS, of very superior quality, and attended with less waste than any other kind of iron used for that purpose. It is also well adapted for nail-roads, horse-shoes, and for other ordinary uses of the blacksmith.

The PATENT METAL is marked with a squirrel, and the initials "R. J. B.," and is to be had only of the "Cwmbrain Iron-Works," near Newport, Monmouthshire.

CERRO DEL BOTE MINING COMPANY.
(Provisionally Registered, under 7 and 8 Victoria, cap. 110.)

Capital £50,000, in 5000 shares, of £10 each, payable in four instalments. The object of this company is to PROSECUTE and EXTEND the WORKS in the valuable SILVER MINE of the CERRO DEL BOTE, in the State of ZACATECAS, MEXICO, the drainage of which, by steam-power, being now completely established and effectual, the capital will be devoted to works of discovery and opening fresh ground—the present extraction of ores paying every other expense of the mine.

Prospectuses and every information can be obtained at the office of the company, No. 13, Austinfriars; or at that of John Taylor, Jun., Esq., No. 6, Queen-street-place, Upper Thames-street—at either of which places applications for shares (addressed to the committee) may be made.

CERRO DEL BOTE MINING COMPANY.—PERSONS desirous of TAKING SHARES in this COMPANY are requested to make early application, as the subscription list will shortly be closed.

TRETHEVEY COPPER MINE.—This MINE is situated in the parish of ST. CLEER, near LISKEARD, adjoining and parallel to the SOUTH CARADON MINES, whose riches are almost unequalled, and the vast profits realised by the fortunate adventurers are too well known to need comment: £5 per share was only expended, when they came to enormous riches. West Caradon, too, in the same neighbourhood, has turned out exceedingly rich. It is believed a similar fortune exists in TRETHEVEY COPPER MINE; and when we view the trifling risk per share which is required to carry on the adventure, compared to the almost certain prospect of success, no one can object to the insignificance of the sum required. The mine is in a most beautiful valley at the foot of the Granite Hill of Caradon, a situation well known to miners to be productive. Cross-courses intersect the lodes at all points, being indicative of great mineral deposits. The east and west lodes are eight in number, large and well defined, with the two great South Caradon cross-courses running through the set, as well as the West Caradon, and other large cross-courses. The go-sun, peach, prlan, and black and yellow copper ore, is of a rich description.

A shaft has been sunk to the 25 fathoms level under the adit—the adit being 5 fathoms deep, but, owing to the scarcity of surface water in summer, the work could not be further prosecuted. Sufficient was seen of the lodes to evidence within 10 or 15 fathoms deeper that riches exist; carrying, as it does, at that level, rich black and yellow copper ore, with all the characteristics of South Caradon. The work done will belong to the adventurers, subject only to a small payment for the water-wheel and pump-work now on the set, which will hereafter be paid by the shareholders, when arranged, as also about £2100 preliminary expenses. It is now, therefore, only necessary to erect a 40-in. cylinder steam-engine, with pumps, &c., and sink the shaft 15 fathoms deeper, the estimated cost of which is £1000; when this is accomplished, there can be very little doubt but that the shareholders will congratulate themselves on the stability and profitable nature of their adventure. The engine can be assisted by the water-wheel eight months in the year, so that the working expenses of the engine will be comparatively small, and every economy will be used in the works. In order to carry out this undertaking in a *bona fide* and reliable manner, it is proposed, and agreed to by all parties concerned, that £1000 shall be banked, being obvious that the importance and flattering prospects of the mine fully justifies such determination, so as legitimately to proceed with the works, for the purpose of developing the riches, which all competent judges, who have seen it, unhesitatingly declare exist in the Trethvey Copper Mine. It will be here seen that the mine is not brought forward as a mine of a speculative character, but with the sole view of bringing a valuable property into commercial and profitable investment.—Sixty shares are reserved to the owners of the mine. The dues to the Lord is one-fifth.

Purvey.—Mr. JAMES TIMMELL, Exeter. Bankers—Devon and Cornwall Bank, Liskeard and Exeter; Messrs. Sanders, Exeter. Solicitor—H. W. HOOPER, Esq., Exeter.

The Mine is divided into five hundred and twelve shares; to be paid at various periods hereafter fixed, if required.—First deposit, £1; second deposit, £1; third deposit, £2. The liability of each shareholder is about £4 per share.

It is believed that very little more than £1500 will be required before the mine is in profitable work. The greatest portion of the shares are already taken up by highly-respectable shareholders. Mr. Henry Vatcher, Exeter; Mr. Thos. Sanford, Exeter; Edward Suter, Esq., Exeter; Mr. James Timmell, Exeter; Mr. Tricketts, Plymouth; Mr. John Seymour, Liskeard; and James Lane, Esq., 80, Old Broad-street, London, will receive applications for the few remaining shares, of whom all further information can be obtained.

TO COAL AND IRONMASTERS.—The PROPRIETOR of an extensive range of several SEAMS of very superior COALS, on the borders of DERBYSHIRE, with the most favourable means of transit to the best market in the realm, both by railway and canal, each within a few hundred yards, is now prepared to LEASE the SAME on favourable terms. The above will be found most desirable, as a sufficient market already exists for an immense quantity of them.—Also, an EXTENSIVE RANGE of IRONSTONE may BE LET with the SAME, if desirable. For particulars of the same, application to be made to "B. C.," at the office of the Mining Journal, 26, Fleet-street, London.

TO LAND AND MINING SURVEYORS.—WANTED, a SITUATION, by a YOUNG MAN, who has been for the last nine years extensively engaged both in LAND and MINING SURVEYING, and is a good DRAFTSMAN. Satisfactory references can be given as to capabilities, &c.—Address "A. B.," Post-office, Longton, Staffordshire Potteries.

WANTED.—A MINING AGENT, or CAPTAIN, capable of taking the CHIEF MANAGEMENT of LEAD MINES in WALES; he must be an engineering and practical miner, and a good accountant.—Address, stating terms, with testimonials of ability and integrity, to Mr. T. P. Thomas, No. 3, George-yard, Lombard-street, London.

A COMMISSION AGENT at WOLVERHAMPTON, with a first-rate CONNECTION amongst MERCHANTS and FACTORS, having a good MARKET for the SALE of COKE TIN-PLATES, is desirous of OBTAINING a COMMISSION for THEIR SALE, from some respectable manufacturer.—Address to "B. B.," Post-office, Wolverhampton.

BLOCK TIN AND TINNED PLATES.—A GENTLEMAN, in GLASGOW, who has a GOOD CONNECTION amongst COPPERSMITHS, BRASSFOUNDERS, &c., would be glad to enter into correspondence with parties regarding an AGENCY for the SALE of the ABOVE in the WEST of SCOTLAND. Satisfactory references and security can be furnished.—Address "W. J. M.," Messrs. Hart-hill and Salmund, news agents, Glasgow.

ALTERATION OF NAME.—In consequence of there being so many Mines in Devon and Cornwall called "Wheel Prosper," the directors of OLD WHEEL PROSPER have now ALTERED ITS NAME to one much more appropriate—viz., WEST FOLGOOTH.—A PROSPECTUS of the MINE, under the new company, will be ready for ISSUE on MONDAY next. Applications for shares may be made till 31st December, of Mr. Robert Williams, at Mr. Richardson's offices, 15, Old Broad-street, London.

CAMBORNE CONSOLS COPPER MINES, CAMBORNE, CORNWALL.—OFFICES REMOVED to No. 22, NEW BRIDGE-STREET, BLACKFRIARS.—London, Dec. 22, 1849. H. L. T. VON USTER, Secretary.

COURT GRANGE SILVER-LEAD MINES, CARDIGANSHIRE.—OFFICES REMOVED to No. 22, NEW BRIDGE-STREET, BLACKFRIARS.—London, Dec. 22, 1849. H. L. T. VON USTER, Secretary.

MINING PROPERTY.—MR. JAMES HERRON, MINE AGENT, 33, CLEMENTS-LANE, LOMBARD-STREET, has received instructions to DISPOSE of SHARES in FIRST-CLASS MINES, paying regular dividends, and yielding to the purchaser from 17 1/2 to 25 per cent. upon his outlay. He is also in a position to transact business in the following—viz.: Holmbush, Condarrow, North Rocker, South Bassett, South Wheel Franches, West Providence, Tremayne, Trevelyan, East Buller, Tincroft, Tamar, Treviskey, East Wheel Rose, United Mines, Gwennap Consols, St. John del Rey, and United Mexican Mines.

MR. T. A. READWIN, MINING OFFICES, 2, WINCHESTER-BUILDINGS, OLD BROAD-STREET, LONDON.

MR. H. R. RYE has BUSINESS to transact, both as BUYER and SELLER in all the leading MINES in Cornwall, Devon, and Wales. For particulars, apply at his office, 77, Old Broad-street, City.

MR. K. TRIPP, MINING AGENT AND SHAREBROKER, BEDFORD CHAMBERS, BAMPFOLDE-STREET, EXETER.

MR. C. S. RICHARDSON, CIVIL ENGINEER, LAND AND MINING SURVEYOR, No. 15, OLD BROAD-STREET, LONDON.

MR. GEORGE BAILEY, JUN., CIVIL ENGINEER AND SURVEYOR, WOLVERHAMPTON. Offices in Queen-street, corner of Piper's-row. N.B.—UNDERGROUND MINING SURVEYS accurately executed.

BLAENAVON IRON AND COAL COMPANY.—The INTEREST on the DEBENTURES in this company, payable half-yearly, may be RECEIVED on application at these offices on and after the 5th of January next, between the hours of Eleven and Three o'clock. By order of the board, **JAMES BOOTH**, Secretary. Offices, 4, Pancras-lane, Dec. 14, 1849.

CONSOLIDATED COPPER MINES OF COBRE ASSOCIATION.—Notice is hereby given, that a HALF-YEARLY GENERAL MEETING of the Proprietors of this Association will be HELD, in conformity with the Deed of Settlement, at the offices of the Company, 26, Austinfriars, on Tuesday, the 8th day of January, at One o'clock precisely.

On that day two directors—viz., Russell Elicke and Walter Shairp, Esqrs., and one Auditor, Alexander Bruce, Esq., will go out of office by rotation, agreeably to the Deed of Settlement, but are immediately re-eligible, and are candidates for re-election. It is necessary that persons intending to offer themselves as candidates for the direction and audit should leave notice of such their intention with the secretary, at the office of the company, 26, Austinfriars, at least 14 clear days before the day of election.

Notice is also hereby given, that a Special General Meeting of the Proprietors of this Company will be held immediately after the preceding Half-yearly General Meeting, to authorise an alteration being made in the Company's Deed of Settlement, by increasing the present amount of the reserved fund, such increase to be effected by an addition of 5 per cent. on the amount of each dividend that may then and subsequently be declared. By order of the Court of Directors, **WILLIAM LECKIE**, Secretary. 26, Austinfriars, Dec. 19, 1849.

GUADALCANAL SILVER MINING ASSOCIATION.—PAYMENT OF CALLS.—The attention of the shareholders is particularly requested to the proceedings of the Adjourned General Meeting, held 15th December inst., at which the DATES of the remaining CALLS due on the NEW SHARES last issued were ALTERED, in consideration of a preference to the extent of 25 per cent. of the net profits to be given to the same, the sum of THIRTY SHILLINGS per share remaining due will now become PAYABLE, in two instalments of 15s. each, on the 1st of January and 1st of February, 1850, respectively, instead of January 1, March 1, and May 1, 1850. By order, **H. T. RYDE**, Secretary. 34, Broad-street-buildings, London, Dec. 19, 1849.

KINZIGTHAL MINING ASSOCIATION.—NOTICE OF CALL.—Notice is hereby given, that the directors of the KINZIGTHAL MINING ASSOCIATION have this day made a CALL of FIVE SHILLINGS, or Three Florins, per share, and have appointed such call to be PAID on or before Monday, the 21st of January, 1850, to their bankers—viz.:—

In LONDON.—Messrs. Masterman, Peters, and Co. In STUTTGARD.—Messrs. Doerrenbach and Co. By the Statutes of the Association interest, at the rate of 5 per cent. per annum, will be charged upon all sums in arrear after the 21st of January, 1850. By order of the board, **GEO. COPELAND CAPPER**, Sec. 1, Adelaide-place, London-bridge, Dec. 15, 1849.

ROYAL SANTIAGO MINING COMPANY.—The directors hereby give Notice, that the HALF-YEARLY GENERAL MEETING of the shareholders will be HELD at the office of the company on Wednesday, the 2d January next, at One o'clock precisely, when the directors will make their report: after which the MEETING will be made SPECIAL, for the election of a director, in the room of Sir Samuel Scott, Bart., deceased.—Any proprietor intending to offer himself to become a director, must leave notice of such his intention, and deposit his certificate of shares to make out his qualification, at the office of the company, at least 21 days before the day of meeting.—38, Broad-street-buildings, Nov. 24, 1849.

TO THE OWNERS OF COLLIERIES, MINES, PLANTATIONS, SAW-MILLS, &c. IMPROVED CIRCULAR SAWS, MILL-SAWS, FILES, Machine Irons, and Cutting Knives, Steel in Blister, Bar, Cast, Shear, and Drift Steel, Springs for Railways and Common Roads, Iron Washers, Bolts, Hammers, &c., on the most PERFECT and ECONOMICAL PRINCIPLES, MANUFACTURED with DISPATCH, by **BLAKE AND PARKIN, THE MEADOW STEEL-WORKS, SHEFFIELD.**

HAGG'S PATENT VENTILATOR AND CONTINUOUS BLAST-BLOWER.
DEPT.—No. 89, MINORIES. This APPARATUS is confidently recommended to the notice of Proprietors of Mines, Shipowners, Engineers, Smiths, &c., being a most effectual form of VENTILATOR for MINES, SHIPS, BUILDINGS, &c., and at the same time a powerful and economical FURNACE and FORGE BLOWER. For description of the machine, vide Mining Journal of November 17, 1849.

THE COAL-FIELD OF NORTHUMBERLAND AND DURHAM.

[From the *Morning Chronicle*.]

In this letter I propose to give an introductory sketch of the occupation furnished by the raising of coal from the mines of Northumberland and Durham—describing the mineral field itself—touching upon the statistics of the trade during its progress to its present condition, and adding such an outline of mining operations as will enable the reader the better to understand those minute details connected with the working of coal-pits—the daily life of the hewers, putters, drivers, and trappers, and the ventilation of mines, so far as the subject seems to be sanitary, rather than purely scientific—into which, in subsequent communications, it will be my duty to enter.

In the north-eastern corner of England lies that great carboniferous deposit which supplied, in 1845, eleven-twelfths of the entire mass of coal burned in the grates and furnaces of the kingdom. The boundaries of the great northern coal-field are mapped out with some distinctness to the north and west, but their southern limits are vague and unsettled, and the eastern frontier of the mineral region lies deep within the German Ocean. Speaking in general terms, the Northumberland and Durham coal-field is bounded to the north and south by the Coquet and the Tyne. The Coquet is a Northumbrian stream, rising amid the southern slopes of the Cheviots, and joining the ocean some 20 miles north of Tynemouth. The Tyne separates Durham from Yorkshire; between these rivers run the Tyne and the Wear, draining the broadest and richest portions of the coal-field, and on their banks lie scattered the oldest, deepest, and most extensive pits. Like almost all coal deposits, the strata forming the Newcastle-field "dip" to a common bottom, somewhat in the manner of a basin, and of this basin the centre, and, therefore, of course, the deepest point, lies near the sea-coast, hard by Sunderland. Here are situated the deepest mines, one of which, that of Monkwearmouth, is the most profound excavation in the world, sinking more than 1500 feet beneath the level of the sea. The centre of the coal basin being thus near the ocean, and the line of coast running a pretty accurate transverse, it follows that, so far as we know, the land and sea divide in two pretty equal portions the great northern coal-field. Twenty miles westward from Tynemouth, the lower strata, forming, of course, the under edge of the basin, begin to rise up into dry land; and it is probable that 20 miles to the eastward of Tynemouth, the other extremities of these strata have themselves upwards to the bottom of the ocean. The landward portion of the coal-field thus forms a sort of half oval, attaining its greatest breadth not far from the point where the Tyne intersects its inland boundary. The length of the Newcastle-field, or, at all events, of the workable portion of it, is about 44 miles, and the greatest breadth about 20. A glance at a geological map will show the great slice of the shires of Northumberland and Durham, within which the coal strata extend. This slice includes about one-third of the seaward face of the first county, and at least two-thirds of the seaward face of the second. From its northern extremity, at the mouth of the Coquet, the coal-field strikes gradually inland, running at an acute angle with the coast. From its southern angle, about Barnard Castle, on the Tyne, the precious mineral runs seaward, almost at right angles to the coast line, being hereabouts more or less overlapped by vast layers of magnesian limestone—beneath which, however, it is now demonstrated that the coal extends to an unknown distance to the southward. Following the landward boundaries of the basin topographically, they may be described as commencing on the Coquet, and passing southwardly and westerly in the vicinity of the Northumbrian towns of Acklington, Morpeth, Præstwich, Callerton, Heddon-Ovingham, Mickley, and Newlands. Here the Tyne divides Northumberland from Durham, and passing into the latter county we find the coal line stretching past Heyfield, Wolsingham, and Redburn to Barnard Castle, where it forms an angle, and runs in an undulating line, past Bishop Middleham and Castle Eden, to the sea. Coal strata, indeed, extend to the southward of this last stretch of boundary, but the workable part of the field lies north of it. The reader will thus perceive that the northern coal-field is an irregular, but, on the whole, oval space—the greatest portion of it to the west of high-water mark, and that portion watered by two great rivers, bounded by two less important streams, and containing the smaller shipping stations of Amble and Blyth, and the greater shipping depôts of Shields and Newcastle-on-Tyne, Sunderland upon the Wear, Hartlepool, and Stockton.

I have said that the coal strata dip in a basin-like shape, and that the centre of this basin, and, therefore, the centre of the coal-field, lies near Sunderland. It will follow as a general rule that the deepest pits have been sunk upon the sea coast of Durham. Following the shore from the northern to the southern extremity of the field, the depth to which pits have been sunk so as to command good seams is as follows:—In Northumberland, the Coquet pits average 80 fms., the Cowpen pits 100, the Hartley, and the Whitby 60. In Durham, at South Shields, coal is brought from a depth of 200 fms., at Monkwearmouth from a depth of 268 fms., at Marton Winning from 220, and at Castle Eden from 150 fms. Several of the southern and eastern collieries are situated upon the overlapping strata of magnesian limestone, which here intrudes into the coal-field. It is a fact, however, that where the limestone begins, the successful search for coal would end. This was the favourite scientific theory of which Professors Sedgwick and Buckland were the chief exponents. Practical miners, however, have demonstrated the fact to be otherwise. At Hetton 156 feet, at Monkwearmouth 200 feet, and at Haswell 280 feet of solid limestone were pierced through before the adventurers arrived at coal seams extensive enough to be profitably worked.

The basin-shaped strata of coal are divided from each other by great layers of sandstone and bituminous shale. On a rough calculation, there may be about 80 distinct beds of coal, one lying beneath the other, and all of them, as a general rule, dipping in a similar direction. Out of about 1700 ft. penetrated, it is calculated that the various layers of coal make up an aggregate bed of 24 ft. in depth. The different strata are of all degrees of thickness, from more than six feet to less than six inches. Of course the very thin strata count practically for nothing; they cannot be worked. Of the principal layers, that called the High Main, from which the original Walls-End coals were dug, is about six feet in thickness. The Low Main is 6½ feet; the Bensham seam is four feet; and the Coal-yard seam three feet. These layers of coal must not be supposed to extend in uniform sheets across the whole field. Great convulsions of the earth have broken and scattered them—flung them up at one point, and ground them down at another. Indeed, it often happens that with the change of level the quality of the coals changes also. Thus, in the valley of the Tyne, a particular seam, called the Low Main, furnishes a species of coal used for furnace purposes, having a splintery fracture, little bituminous, yielding a rapid, though not a lasting heat, and depositing a quantity of white ash. This is the class of mineral called steam coal; but the vein which furnishes it, in passing south, acquires another quality, takes another name, and under the titles of Hetton, Lambton, Stewart's, &c., commands the highest price as a household coal in the London market. As a general rule, the deeper a seam runs the higher becomes the quality of the coals. In spite of this, however, it often happens that a seam running still lower furnishes an inferior species of mineral. So far as the nature and quality of the coals, the production of the Newcastle field, can be topographically arranged, I have reason to believe that the following classification may be relied on:—The main seams of the Tyne, the Wear, and the Tees, and the Hetton seam of the second river, furnish the coals best adapted for domestic purposes. The best gas and coke coals come from the mines to the south-west of Newcastle, in the vicinity of Durham and Chester-le-Street. The Northumberland coals, as well as the Low Main of the valley of the Wear, are those best suited for steam purposes.

The probable duration of the supplies afforded by the coal-field of Northumberland and Durham, is, perhaps, to us not a very practical, but it is a very interesting question, and a communication professing to give a general prefatory view of the coal trade would hardly be complete without some reference to it. In 1829 and 1830 two parliamentary committees sat upon the coal trade, and calculations as to the probable duration of the supply from the Durham and Northumberland field were laid before each. Dr. Buckland was one of the estimators. He admitted that his calculations were "vague and conjectural," and he founded them upon a basis which has since been practically demonstrated to be erroneous. Dr. Buckland believed that beneath the masses of limestone which formed the old south-eastern boundaries of the basin no coal would be found, and he fixed the probable duration of the supply to the northward and westward at about 400 years, taking the quantity of the mineral to be annually brought to the surface at the amount dug up during the year previous to his calculation. Other and more practical estimators fixed a far longer date to the era at which the Northumbrian and Durham mines will become unworkable. Mr. Biddle estimated the average thickness of all the coal seams in Durham at 25 feet 8 inches, and of all those in Northumberland at 21 feet—the calculation, taking it in connection with the comparative extent of each field, giving an average thickness of 24 feet over the whole basin. But of this 24 feet, a considerable proportion is made up of beds only a few inches, or perhaps a foot or two, thick, and, therefore, practically unavailable. Mr. Hugh Taylor, a gentleman of vast practical experience, estimated the depth of coal over the whole field as eight feet of available mine—a calculation which, taking the vend of 1829, would give us 1787 years ere we shall have exhausted the Great Northern field. Later calculations have somewhat shortened the period, because they are founded upon the supposition of an increasing vend. An estimate, drawn up on high practical authority, computes the extent of the coal area as 924 square miles. The mean thickness of the mineral is taken at 18 feet. To make allowance for what are called "denudations," that is, spots where strata have broken entirely off, 3 feet are allowed, leaving the net thickness 15 feet. But still further deductions have to be made for minor obstacles, such as "dykes," and "troubles," by which the level of a seam is suddenly changed, and also for the impossibility in all cases of working out the entire mass of coal. For these drawbacks the estimator gives up one-third of his calculated available thickness, leaving finally a depth of 10 feet of coal, extending over a superficies of 924 square miles. The produce would be about 9,107,000,000 tons of coal. From this, there being subtracted 1,517,900,000 tons as already excavated, the result would be about 7,590,000,000 tons, which, at the consumption of 1837, would give us a supply for 1450 years. Let the precise period, however, be what

it may, the majority of calculators estimate the time during which the yield of coal in the Newcastle field is likely to last over 1000 years.

I have mentioned various irregularities in the lie of the strata. These are known to miners as "faults," "troubles," "hitches," and "dykes." Some times a vein of stone suddenly intersects the seam. Sometimes it breaks off short, and then continues at a different level, either above or below. Two principal dykes, or sudden breakings off and changes of level, intersect the northern coal-field, both of them running in a general easterly direction. The great dyke divides the seams principally worked near Newcastle and North Shields, including Walls-End, perpendicularly down to an extreme extra depth of 180 fms., so that two collieries may be working the same seam within a quarter of a mile of each other, but at a difference in depth of from 90 fathoms to 180 fathoms perpendicular. The low level extends on the northern side of the dyke. The other principal phenomenon of the sort is the Hemerth dyke, south of which the main seams suddenly rise 25 fathoms. These dykes are considered to be, on the whole, advantageous, rather than otherwise, to the miner. Sometimes, indeed, the great convulsive movements of the earth, of which they are the tokens, have sunk masses of coal to an impracticable depth, but they have at once upheaved seams to within a working distance of the surface. The Great Dyke has been useful in preventing the Walls-End seam from "dropping out"—that is, appearing at the surface; in which case masses of coal now available would have been long ago wasted by the action of the elements.

The operations of the pitmen are, of course, frequently impeded by springs of water, which, were it not for the system of pumps continually kept at work, would gradually fill up and "drown" the mine. In some pits the quantity of water present is trifling. Throughout the extensive workings of the Gosforth Colliery, embracing dozens of miles of underground galleries, only a few gallons per minute distil. Other pits are very watery. Mention was made before of a parliamentary committee, of a mine the weight of water lifted from which was just eighteen times that of the coals. At Friars' Goose Colliery, 1000 gallons per minute are pumped out, or above 6000 tons per day, the weight of the coals extracted being from 250 to 300 tons per day; and when the Haswell pit was being sunk beneath the magnesian limestone, the engine power drew from the earth no less than 27,000 tons of water daily. These springs, if arising from below a certain depth, are uniformly salt. Where the impregnating matter lies is a mystery, as no indication of rock salt has ever been discovered near the coal-field. In some mines, however, the water which trickles far down amid the coal seams is three times as salt as the sea. This is the case in the St. Lawrence Colliery. At several of the pits the saline springs are so copious that salt works have been established in the vicinity. At Birtley Colliery, near Chester-le-Street, a runnel of hot salt water was discovered in 1794, producing about 1100 gallons per hour. At Lambton Colliery, to the south, and at Walker Colliery, close to the Tyne, salt works are also in operation.

The temperature of coal mines rises in proportion to the depth, the deepest pits being, of course, the hottest. Much necessarily depends upon the efficacy of the ventilating apparatus; but the following statement of temperatures in and about the Jarrow pit gives an idea of the general average proportions of atmospheric heat at different depths:—

At the surface	55 degrees.
At the bottom of the shaft, 145 fathoms	61 " "
Returned air, after having traversed the workings	70 " "
Engine boiler house, 700 yards from the shaft	144 " "

All coal pits are ventilated upon the simple principle of creating a draught of air, by means of a great furnace kept constantly blazing near the bottom of one of the shafts. The details of the contrivances in use I shall state when, after having, as I am now striving to do, given the reader a general idea of what the coal district and the coal trade are, I come to describe, in all their minutiae, the appliances and working of a pit.

In sinking a coal mine, the object of the engineer is not, as might be at first supposed, to come upon the seam at its highest elevation. On the contrary, he digs his shaft where he has reason to believe the bed dips most deeply. Having reached the coals, he then works upwards, and gains the advantage of inclines, down which his laden waggons run to the bottom of the shaft. The old manner of working the seam, and that still practised in Scotland, is called the "long-wall" system, in which the miner digs almost the whole mass of coal out, supporting the roof of the hollow thus formed with wooden props, so long as he is digging in it, and then, when his portion of the seam is exhausted, withdrawing the props, and leaving the undermined soil to collapse behind him. The manner of working adopted in the Newcastle and Durham field is the withdrawal of the mineral in passages crossing each other at right angles, and between which square masses of coal, called "pillars," are left. The seam is thus honeycombed; and when the process is complete throughout its whole extent, the miner retraces his steps, and cuts away as much of the pillars as he can safely to himself, leaving the roof to fall in, and the exhausted mass of the mine to become a series of crumbling caverns, often filled with stagnant masses of fire-damp. The accidents in mines, produced by the temperature of the air of the pit being then more equable, the difficulty of causing a column of fresh air to descend is very much increased. Out of 70 accidents, causing the loss of nearly 1000 lives, there have occurred—

In the spring months	63 mines, 201 deaths
In the summer months	30 " 18 deaths
In the autumn months	30 " 71 deaths

In all deep mines, and more especially in working at a distance from the shaft, the Davy-lamp is uniformly used. It will, however, astonish many persons to learn that during the 18 years previous to 1816, when the safety-lamp was introduced, the loss of life in the counties of Northumberland and Durham, by explosions, was 447—whereas during the eighteen years subsequent to 1816 the amount of life lost in the same way was 558—the difference being accounted for by the working of many "fery collieries," previously inaccessible, by the neglect and carelessness of the workmen themselves in the management of their lamps, and by the too frequent relaxation of ventilating measures that were previously rigidly carried into effect.

With respect to accidents of all kinds in collieries, I transcribe a table given among the results of one of the Parliamentary inquiries into the subject, detailing the number of fatal accidents during the year 1838, and applying to 45 mining districts:—

By falling down shafts	10
By breaking of ropes	10
During the time of ascending and descending shafts	10
Drowned	12
Fall of stones and coals	10
Various injuries in coal-pits	10
Explosions of gas	43
Explosions of gunpowder	21
By trams and waggons	21

For the purposes of ascending and descending into mines, wire-ropes are now coming into general use, and an ingenious invention, which I shall afterwards describe with the fulness which its importance deserves, has lately been patented, the object being to prevent loss of life in case of breakage of the rope drawing the buckets up the shaft.

As a general rule, the mines in the coal district of Northumberland and Durham are worked by lessees, either companies or individuals, who rent the royalty, including everything beneath the surface, from the proprietors. The lessees have generally power to vacate the colliery by giving a year's notice. They are bound to leave the pit in an open and tenable state, and they are liable for all damage done to the surface in the course of working. The principal coal pits worked by and for behoof of their owners are those belonging to the Marquess of Londonderry and the Earl of Durham. The engagements made with pit hands are always by the month, with an occasional stipulation for a certain number of days' work, greater or less, according to the season and the state of the market. The Miners' Union in the Newcastle district was almost totally overthrown by the great strike of 1844, which exercised a very important influence upon the trade.

[To be continued in next week's Mining Journal.]

THE ESCALAPUAN STILL AND CONDENSER.—Mr. J. A. Colley, of Sidney street, Commercial-road-east, has recently protected, under Act 5 and 6 Vic. cap. 65, a chemical apparatus entitled as above, which combines, in a very compact form, a still and condenser, the latter being a novelty by itself; also evaporating apparatus, an oven for heating, &c. It appears to be a most desirable apparatus for the laboratory of every chemical operator.

CHINESE IRON: AN INVETERATE BLUNDER.—The almost utter impossibility of correcting a wrong impression when it has once got abroad through the medium of the metropolitan press, was never more apparent than in the recent instance of the commentaries of the London papers upon an importation of pig-iron from China, in which it was reported to be the produce of the Celestial Empire; for last week, even after some of our Liverpool contemporaries had set the matter right, the following remarks appeared in an article, reviewing the iron trade, in *Alexander's Birmingham Gazette*, and were copied into the city article of the *Sun*, on Monday:—"We have noticed an unexpected importation of pig-iron from China. As for the resources or facilities of production in the Celestial Empire we are at present in the dark, but the reported quality of the sample received is not such as to create just fears of competition, though the fact may serve to correct over sanguine expectations of an extensive market for English pig-iron in that quarter." The facts of the case are these:—The *Hesperus*, belonging to Messrs. Gladstone and Co., of this town, took about 60 tons of Scotch pig-iron to Bombay, to serve as ballast for her return cargo, but, instead of loading home, took a freight of cotton to Canton, and thence proceeded to Manila to load for Europe. The cargo at Manila not requiring this ballast, it was transferred at Canton to the *Manila*—the captain of the latter wanting it for his tea cargo, and offering to deliver it, freight free, to Messrs. Gladstone upon its arrival—an arrangement by which both vessels were benefited. After this explanation, we trust the Ironmasters of Staffordshire will feel under no apprehension in regard to an importation of the Chinese metal.—*Liverpool Advertiser*.

THE GREAT WELSH COLLIERY CASE—DUKE OF BEAUFORT v. MORRIS.

In this important case, which has been for so long a time in the hands of the lawyers without any definite settlement, and in which a fortune must have been expended, the Vice-Chancellor gave judgment on Monday last; he dismissed the plaintiff's petition, with costs, but with leave to apply to the Lord-Chancellor for such order as he thinks fit to make, without a rehearing of the case, or for a rehearing at common law if thought necessary. This decision leaves the question as far from being decided as at the commencement of the action; and to unsophisticated minds, emboldened with common sense, and untrammelled with the ridiculous and dishonest intricacies of the law (the perfection of reason?), it does seem marvellous that after two decisions in the Equity courts, and a trial at common law, all in favour of the defendant, the case on a fourth hearing, in the Vice-Chancellor's Court, should be again sent before the Lord-Chancellor; who, however, will, it is to be hoped, even for the sake of the parties themselves, wealthy though they be, bring the matter to a termination. Such protracted law proceedings tell but little in favour of the morality and good feeling of the community. On coming to the above decision, the Vice-Chancellor said, he wished the Lord-Chancellor should know exactly on what grounds he had proceeded in forming his judgment, and he considered the case was this:—"Before the drift was made, the waters from Cas Grobos flowed through some channels, natural or artificial, to Pentre, and from Pentre they flowed by some channels, natural or artificial, to the plaintiff's colliery, called the Llandwr Colliery. This drift was made, and at the time the bill was filed was intended to be used, for the purpose of carrying the water from Cas Grobos to Pentre. The channels of communication between the Pentre and the Llandwr Collieries remain as before. The complaint made by the original bill was not that the plaintiff up to that time had suffered damage and injury by reason of the drift in question, or the water flowing through the same, but that it was not lawful for the defendant to make and use the drift for the purposes I have mentioned; and the ruling of the learned judge at *Nisi Prius* manifestly shows that the plaintiff's view of the case may be correct in point of law. If this be so, I cannot bring my mind to see how the circumstance that at the time of filing the answer the drift had been completed, and yet that no water conveyed to Pentre through the drift had actually flowed to the Llandwr Colliery, can alter the case. The circumstance, that the water up to that time had been received and retained in certain reservoirs cannot alter the case, unless the defendant has shown that the course of drainage is thereby so altered that its permanent effect will be to prevent the water running through the drift from being carried to the plaintiff's colliery through the channels by which Pentre was usually relieved of water before the drift was made. In that view of the case, it appeared to me to be necessary, for the purpose of trying the legal question, that at the trial of the action directed by the decree, it should be stated, as fact, that some water brought to Pentre through the drift had actually flowed from Pentre to Llandwr, and my decree sending the plaintiff to law directed that an admission to that effect should be made on the trial. Upon appeal to the Lord-Chancellor, he directed that admission to be omitted from the decree. The trial has since been had, and a verdict found for the defendant; but I do not understand that any evidence was given on the part of the defendant, to show that any new course of drainage had been provided by means of which the water from Cas Grobos through the drift would be carried away from the plaintiff's colliery. This part of the case was met on the part of the defendant by showing that up to that time no water carried from Cas Grobos through the drift had, in fact, flowed to the plaintiff's colliery. The necessary consequence of this was, that there was a verdict found for the defendant, the only question at law being whether damage and injury had at that time been actually sustained; but, as the learned judge observed, that not being the actual question really intended to be tried, and looking at the answer and the subsequent proceedings at law, my opinion certainly is that the plaintiff has a right to have the case put a second time in a course of trial. It must be distinctly understood that I acquiesce in the propriety of the Lord-Chancellor's order at the time the order was made, but I do not understand and the Lord-Chancellor to have expressed any difference of opinion from myself as to the question to be tried in the action; and it is clear that the defendant, by the course taken by him at the trial, prevented that question from being tried. The remaining question is as to the propriety in point of practice of the proceeding now before me to obtain the plaintiff's object—a second trial of the right. I should not have thought that the mere circumstance of the decree directing an action or issue being made by the Lord-Chancellor would deprive a subordinate judge of jurisdiction to direct a proceeding different from that directed by the Lord-Chancellor, if from the conduct of the parties or otherwise a trial had, under the Lord-Chancellor's decree, not determined the right to the satisfaction of the Court. I do not understand that Lord Langdale ruled differently from this, except in holding that where the original decree was made by the Lord-Chancellor, it was not competent to any one but the Lord-Chancellor to direct any different proceeding."

THE GERMAN MINING COMPANY—WINDING-UP.

In the Vice-Chancellor's Court, on Wednesday, a motion was made, on behalf of the official managers of this company, for the commitment, to the Queen's Bench of Mr. George Stone, the banker of Lombard-street, founded on the certificate of Master Tynney, that Mr. Stone had not fully answered to his satisfaction in the examination in the Master's office, in the proceedings of the winding-up of the affairs of the company. Mr. Stone was one of the creditors assigned of Christopher Richardson, a bankrupt, a member of the German Mining Company, in respect of two shares, of 500l. each, at the time of his bankruptcy.

Mr. Lloyd and Mr. Bick supported the motion, and stated that various proceedings took place in the Master's office, and upon giving answers to several questions it appeared to the Master that it was needful for Mr. Stone to inspect the proceedings in the bankruptcy, in order to enable him to answer such questions as might appear to be necessary to be put to him touching the matters upon which he had before been questioned. Upon the ground that he had no authority to look into the proceedings, he had declined compliance.

Mr. Russell and Mr. Rogers opposed the motion, contending that Mr. Stone was perfectly correct in the view he took as to not being, in his character of assignee, entitled to look into the proceedings in the bankruptcy for any purpose foreign to the fiat. Although the fiat was a London one, it might have been one in a remote part of the country; and, if a party could be required to go to any place in the city of London for such a purpose, he might equally well be required to go to the country, and when he did go he would have no authority to inspect the proceedings.

His Honour, during the motion, said he had never heard of an assignee not being entitled to see and examine the proceedings. All that Mr. Stone was asked to do was to look at them, in order to enable him to answer questions, the nature and purport of which he perfectly well knew, from the examination that had previously taken place. At the close of the arguments, the learned judge proceeded:—"I think the Master has been most justly dissatisfied with these answers. It rests with Mr. Stone to consider whether he will endeavour to obtain access to these proceedings, for the purpose of obtaining such information as they will afford him with reference to the matters, as to which he thoroughly well knows the questions which are desired to be put to him when he shall obtain that information. The Master will judge how far the questions that will be put to him are questions that ought to be answered. What does Mr. Stone wish to do? If he declines to do anything, I shall commit him. I recommend him, in the meantime, so far as I am with propriety do so judicially, to endeavour to make himself master of these proceedings. Then he can go before the Master, and either answer, or object to answer, the questions. When he has obtained the information, *non constat* that he will be able to answer. If the motion is brought on again, the judge before whom it is brought will form his judgement with a knowledge of what has now taken place. Will it not be better that this should stand over till next term? I am of opinion that, if Mr. Stone will make an endeavour to acquire this information, his endeavour will succeed. Then he can attend before the Master, and either answer, or object to do so. I would rather not commit any one until the last extremity."

Mr. Russell said, that no doubt Mr. Stone was anxious to do all that was right, and a man in his position could only act by his agents.

His Honour: True, he may act by his agents, but they cannot be committed for him. Let the motion stand over to next term.

THE TONKIN LIFE ASSURANCE COMPANY.—The winding-up of the affairs of this company came on before the Master in Chancery, Richards, on Tuesday, upon the petition of Sarah Dee, setting forth that the scheme was projected with a capital of 400,000l. in 20,000 shares of 20l. each, with power to increase the capital to 2,000,000l. Business was opened at 20, Pall-mall, by the directors, the Hon. E. Curzon, Dr. Conolly, W. H. Burrell, W. H. Cadogan, T. W. Fleming, Hon. R. Rowley, F. H. Lindsay, A. H. Proctor, and R. Hoy; but, as many of the shareholders did not pay up the first subscription (1l. per share), the directors, without calling a meeting of the shareholders, in accordance with the Deed of Settlement, to consider the propriety of such a course, passed a resolution on the 17th August last, dissolving the company, and transferring the business funds and debts to the Engineers, Masons, and Life Assurance Company, informing the shareholders simultaneously, that unless the 14. were paid to liquidate the expenses incurred, proceedings would be taken for the recovery thereof. These calls not having been responded to, petitioner prays that as there are outstanding liabilities to a considerable extent, and that as two policies of insurance granted by the company have become payable, but for which no provision has been made, the affairs may be required into and wound up. The Master appointed Mr. H. Croysdill, of Old Broad-street, official manager, to proceed with the affairs.

DIRECT LONDON AND EXETER RAILWAY.—Notice of appeal against the decision of the Master in Chancery, Brougham, rendering all parties who had signed the deed, or paid the deposit, contributories to the expenses of winding up the company, has been lodged with the view, on the ground of fraud, rendering the directors alone liable, and compelling them to return the de...

THORNEYCROFT'S PATENT RAILWAY AXLES, RAILS, AND TYRES.

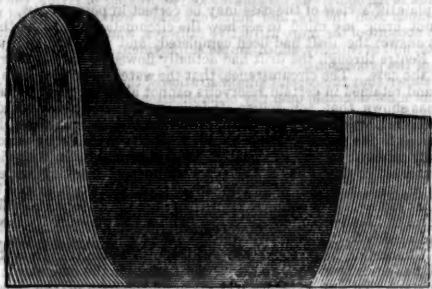
RAILWAY TYRE.—SECTION No. 1, HALF SIZE.



The middle, or wearing, part of this tyre is composed of chrysaline charcoal iron, the hardest and soundest iron made. The outward edges are made from a mixture of India charcoal pig with the toughest fibrous iron—the whole made upon an improved principle into one homogenous mass. These charcoal tyres are warranted better and more durable than any tyres made in England.

Price—£16 per ton net at the works, up to 3½ cwt. each.

RAILWAY TYRE.—SECTION No. 2, HALF SIZE.



The middle, or wearing, part of this tyre is composed of the best refined chrysaline puddled iron. The outward edges are of the best No. 3 fibrous iron, and put together upon an improved principle into one homogenous mass. These tyres are warranted quite equal to any made in Staffordshire.

Price—£19 10s. per ton net at the works, up to 3½ cwt. each.

BEST STAFFORDSHIRE TYRES.—£8 10s. per ton at the works, up to 3 cwt. each.

Fig. 1.

SECTION OF BRIGGS' PATENT COMPOUND AXLE.

Scale ½ inch to a foot: parallel axle.



Price—£14 per ton net at the works.

Fig. 2.

SECTION OF BRIGGS' PATENT COMPOUND AXLE.

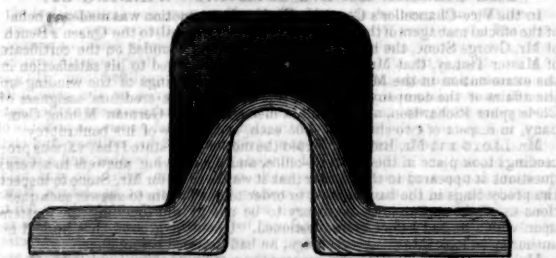
Showing the extent to which the internal bar is welded solid at each end, drawn down to the middle half an inch.



Price—£15 per ton net at the works.

PATENT ANTIMINERATING CHARCOAL RAIL.—SECTION No. 1, HALF SIZE.

Price—£10 per ton net at the works.



Patent Antiminerating Rails, made from the same quality as the best S & iron. Price—£7 10s. per ton net at the works.

The upper, or wearing, part of these two sections of rails is made from antiminerating charcoal iron, much harder than any other iron, perfectly free from lamina. The under, or fibrous, part from best No. 3 puddled iron.

PATENT ANTIMINERATING CHARCOAL RAIL.—SECTION No. 2, HALF SIZE.

Price—£10 per ton net at the works.



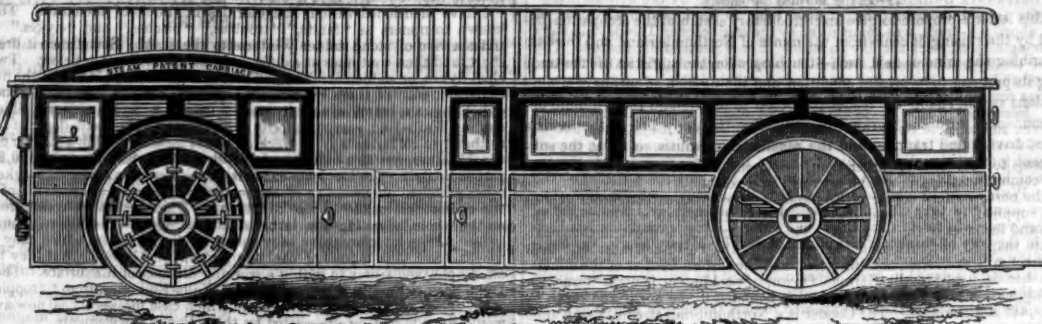
Patent Antiminerating Rails, made from the same quality as the best S & iron. Price—£7 10s. per ton net at the works.

Rails of the same sections are made from puddled iron, quite free from lamina in the wearing part, but soft and less durable than charcoal rails. This principle is applicable to any kind of rails.

I beg to inform the railway public, that the machinery for testing the strength of axles, and the strength and soundness of the tyres, is now ready; and I offer it to the public without any charge for its use, to try any one's make of axles and tyres they may think proper. A machine has been designed, and is now making by Messrs. Fox, Henderson, and Co., for proving the quality and durability of tyres and rails by actual wear and tear, the same as when at work on a railway, at any speed you like. The name of the designer is, I trust, a sufficient guarantee for its efficiency; in fact, it will be so true a test, that it must prove satisfactory to the most fastidious mind; and, so soon as it is completed, it shall be offered to the public, on the same terms as the testing machine above-mentioned.

Shrubbery Iron-Works, Wolverhampton. G. B. THORNEYCROFT.

STEAM-CARRIAGES ON COMMON ROADS.



RESPECTED FRIEND.—Agreeable to my promise, made in a former communication, which accompanied the engraving of our patent plan for timber tracks and timber street paving—viz.: that I hoped shortly to be enabled to furnish you with an engraving of our patent steam-carriage for common roads—I accordingly now furnish you therewith.

The above engraving represents what may be termed a maximum carriage for the turnpike-road, calculated to convey from 50 to 60 persons, or (say) at least 8 first, 12 second, and 30 third-class passengers. I shall not attempt to give a detailed description of all the different arrangements, but only notice a few of the most important features. The boiler is so constructed, as to occupy less space, and 50 per cent. less weight, than all former plans or designs. The apparent railing on the top, behind which are the seats for outside passengers, are brass tubes, into which the steam from the cylinder escapes, passing through the whole series to the end of the carriage, where, becoming condensed, it falls into a reservoir, and is again forced into the boiler; and as we purpose to use distilled water, the inconvenience of incrustation is almost entirely obviated, and the boiler will not require a further supply of water for weeks or months together.

The next important feature is the mode of steering, which is entirely new, and, consequently, different to all former attempts, for by one motion made by the steersman it instantly affects all four of the wheels; by which means, notwithstanding the length of the carriage, it may be made to turn an angle as sharp as can be effected by a coach with four horses; and such are the arrangements that, going at the rate of 10 or 12 miles per hour, it may be brought to a standstill in the space of as many feet, or, at most, not exceeding 15 to 18 ft.; and, also, such is the arrangement of the wheels, that though their positions are altered, yet they still revolve on the fixed axle. Great attention has been directed to the best mode of suspension, which appears not to have been sufficiently attended to by all former projectors, to which, added to the incrustation of the boiler through using impure water, may, in a great degree, be attributed their failures; indeed, so perfect do we consider our plan, that the effects of concussion on the machinery will be as little, if not less, than is experienced by the ordinary locomotive engines used upon railways. The smoke, or effluvia, will be conveyed away without being seen, or to annoy the outside passengers; neither will the broken-winded puffings of the railway locomotive be heard—thus the reasonable objection of noise, steam, smoke, and fire will be obviated, and, therefore, all apprehension of inconvenience, or danger, on this account, will be removed.

With respect to the probability of successful or profitable working, upon a careful and minute examination, we are fully satisfied that a carriage of the above description may be worked with or without the road being provided with timber or stone tracks, including every expense—such as fuel, labour, tolls, depreciation of stock, &c.—at a cost not exceeding 1s. to 1s. 6d. per mile, which will, in some degree, depend on the amount of traffic; if considerable, then we believe 1s. per mile will amply cover all the expenses. Let it then be supposed that such a carriage is established to run from Piccadilly to Hounslow (a distance of 10 miles), to perform the journey five times each way in the day, conveying, on an average, 40 passengers at an average charge of 6d. each. This would produce 10l., and the 100 miles, at 1s. 6d. per mile would be 7l. 10s., leaving a clear profit of 2l. 10s., equal to one-third, or about 33 per cent., but assuming the expense at 1s. per mile, leaves a profit of 5l. Now, let us imagine a railway made, say, from Hyde-park Corner to Hounslow, at the comparatively low cost, for such a district, of 40,000l. per mile; this would be 400,000l., the interest of which would be 20,000l. per annum, or about 56l. per day. Let it then be imagined there was sufficient traffic for travelling in each case 500 miles, conveying from 2000 to 3000 passengers in the day, and the tolls on the road to be 2d. per mile; this would be about 4l.; the rent, in shape of interest of the railway, would be about 55l. per day.

I will leave it to your readers to imagine what chance the railway would have, even if they charge double the price mentioned, labouring under the disadvantage of a rent 14 times greater than the turnpike-road; especially when it is considered that the greatest advantage gained by the railway over the road provided with a good timber track, cannot be more than as 1 to 1½, or 1 to 2, taking ordinary undulations into the account.

I am quite aware there are persons void of reason, or common-sense, on this subject, who irrationally argue that, because the attempt has been made and failed, therefore success is impossible. I well remember at an interview I had with the late Earl Stanhope, about the year 1814, who it is well known devoted much time and money in his unsuccessful attempts to accomplish steam navigation, yet he emphatically assured me that he (although unsuccessful) still had not the least doubt but that, ere long, steam would be successfully and profitably employed in navigation. His want of success exposed him to the ridicule, taunts, sneers, and condemnation of the pretending wise judges—viz., the irrational, thoughtless, or ignorant part of the public, which he intimated he did not regard, being so assured of its certainty. Time has proved the accuracy of his prediction, and I hope, ere many months have passed away, we shall also triumphantly demonstrate complete success in the use of steam on common roads—even without the use of tracks; but with good timber tracks I assert success to be indisputable; and, I think, there is no engineer will make the attempt to disprove it. If he does, however eminent, celebrated, or talented he may be, I fear not the result of his, or their, attempt to do so.

Stangate, Lambeth, 12 mo., 20.

THOMAS MOTLEY.

P.S.—We hope to be enabled, shortly, to send you an engraving and description of our patent pile driving engine, which bids fair to surpass all former attempts in effectiveness and economy.

IMPROVED DRILLING MACHINE.—Mr. M. P. Coon, of Lansbury, New York, has taken out a patent for a new stone drilling machine, by which the drill can be worked not only perpendicularly, but horizontally, and at any angle within the plane of a semicircle. This arrangement is effected by the employment of spiral springs, so arranged that they are negative—that is, they are of sufficient power of contraction and extension to counteract, or counterbalance, more than the entire gravitating power of all the machinery required to raise the drill shaft. Upon the same principle, a concussive power is obtained and counteracted; and, consequently, the drill shaft may be worked with any amount of concussive power, and at any angle required. They are constructed of any required size. The drill shafts, weighing from 10 to 1000 lbs., will drill any size hole, from ½ in. to 2 ft. diameter; and the concussion, or blow, for cutting the rock, is wholly regulated by the weight of the drill and the height from which it falls. A Mr. Jack, of Maine, has also taken out a patent for working a drill by springs; but which is the original idea, or whether they are identical or otherwise, we have no means of ascertaining.

IMPROVED DREDGING MACHINE.—J. Callaghan, of Massachusetts, has patented a dredging machine, in which he claims a vertical sliding frame to regulate the scooping line of draught in combination with suspension levers, whereby the buckets, as they revolve over the pulleys, are made to scoop at any angle, and at any depth.

COOKING STOVES.—There would appear to be something like a mania in the introduction of improvements in cookery stoves in the United States. From a list of recent patents before us, we perceive no less than 15 for improvements in their manufacture; and, as well as we can understand the obsolete descriptions of American patents, they appear more or less advantageous. One is for a self-acting register to regulate the draft, according to the expansion of the metal; another for equalising the heat, without using the dampers; another for a plate of iron, to protect the back; another patentee makes the lower grate of a series of tubes, to admit heated air to the oven and regulate it while baking. Upon the whole, there hardly appears among them an alteration, or addition, which would in England be considered an improvement, much less worthy of a patent.

ON THE STRENGTH OF MATERIALS.

At the annual general meeting of the Royal Scottish Society of Arts held at their hall, Edinburgh, on the 12th November, GEORGE BUCHANAN, Esq. (the late president of the society), at the request of the council, gave, an experimental exposition, containing his concluding observations on the strength of materials, as applicable to the construction of cast or wrought-iron bridges, and on the Conway and Britannia Tubular Bridges, the former parts of which were published in the *Mining Journal*, on the 25th of March, 6th of May, and 9th of December, 1848.

In this exposition, Mr. Buchanan, after apologising for the length to which he had been imperceptibly drawn in these communications, commenced by recapitulating the general principles which had formerly been laid down regarding the tensile and compressive strains of materials, and, in addition to the results of former experiments, made at the request of the society, on the stones from different quarries in the neighbourhood, gave now the results of others which had since been carefully made on the harder materials of Caithness and Arbroath pavement, along with white marble and whinstone, as follows, viz.:

	Tensile.	Compressive.
Whinstone.....	1469 lbs.	8270 lbs.
Arbroath pavement.....	1261 "	7884 "
Caithness do.	1084 "	6493 "
Marble	722 "	6131 "

In all these experiments the peculiar nature of the two strains is distinctly exhibited; the specimens exposed to the tensile strain showing a clean fracture and no fragments; those exposed to the compressive being generally crushed to powder, and the fragments flying in all directions by lateral divergence; and generally, when any considerable fragment remains, showing the appearance of a pyramid, from which the sides had been broken—a form which has also been observed in the compression of cast iron. In regard to the transverse strength, he repeated the principles and general rule for calculation formerly explained by adopting what he termed a unit of strength, which differs in each material, but being once determined by actual experiment, affords a datum for calculating the strength of that material in every case, whatever be the dimensions of the masses acted on. This unit expresses the strength of a cubic inch of the material—i.e., a bar one inch square, supported on bearings one inch apart, and loaded in the middle till it breaks. The strength of such a unit for cast-iron had been given on a former evening at 11 tons. In regard to timber, he had himself made various experiments on Memel fir, and had found the unit 4000 lbs. Oak and beech, by other experimenters, were found 6000 lbs.; ash, 8000 lbs.

In regard to the transverse strength of stones, few experiments, he said, had been made on our building materials, although it was a strain they were much subject to in stairs, balconies, covers of conduits, &c. He proposed, therefore, to try several specimens which were now before the meeting—viz., Hailes pavement, Craigleith, and Arbroath. Each of these specimens was three inches thick, nine inches broad, and three feet long, and supported at each end by two upright pillars, the distance between the bearings being exactly three feet. These specimens were loaded by weights successively laid on a scale, hung from the centre of the pavement, until it broke. The Hailes was first tried, and after carrying successively 4 cwt. and 5 cwt. for a little time, at last it gave way with 7 cwt. 10 lbs. A specimen of the same rock and dimensions previously tried gave nearly the same result, being 7½ cwt. The Craigleith carried considerably more. After bearing 7 cwt. and 8 cwt. for some time, it gave way at last with 10½ cwt. The Arbroath pavement was found still greatly a-head even of the Craigleith. After carrying 12 cwt. and 14 cwt. for some time, it went on bearing 16½ cwt. This it bore for a short interval; and while an additional weight was in the act of being put on it gave way. These experiments are important, and appeared to excite much interest. From these the unit of strength is easily calculated.

The transverse strength and the forms of cast-iron girders for spanning wide openings were formerly explained, and the application of malleable iron in the form of hollow tubers or girders; and, connected with this subject, he explained a plan which had lately been proposed by Mr. Boardman, C.E., London, who had favoured him with the results of some interesting experiments made by him. The plan consisted in constructing fire-proof or other floors by girders, consisting merely of thin plates of sheet-iron running parallel to each other at intervals, like ordinary joists resting on the walls at each end; these plates strengthened and united to angle irons on the top, and to a thin plate below, running the whole way between the girders. The interval between them is filled up with a mass of concrete, the use of which is chiefly to keep the thin plate girders in their place, so that, being incapable of bending, the full effect of the section of the iron is obtained, whereby the strength of such flooring, considering the thinness of the metal employed, is truly remarkable. In one experiment, where the girders consisted of sheet iron, No. 14 gauge, or 1-12th of an inch thick and 13 inches deep, and placed 13 inches apart, and the length or span between the walls or bearings 23 feet—also the total sectional area 6½ inches, while that of the concrete was 331 inches. This was loaded with 8000 lbs., which is nearly double the weight of any number of persons that could have room to stand on the beam, and only deflected half an inch. With 12,000 lbs. it deflected about 3-4ths of an inch, which was considered the probable limit of safe deflection. With 13,670 lbs. it deflected one inch; it was not loaded further, but the calculated breaking weight was 25,000 lbs. Mr. Buchanan then showed a model floor on this principle, consisting of the thinnest tin plate iron girders, 3 feet long, 1½ inch deep, and 2 inches apart, and the spaces filled in with plaster of Paris. Even this slender material carried with safety a person standing in the middle, and only gave way with 3 cwt., chiefly owing to the joints in the bottom plates not being soldered, but merely laid over.

Mr. Buchanan then proceeded to give an interesting description of the Conway and Britannia Bridges, but was prevented completing his paper, in consequence of other important matter then before the society.

* [To be concluded in next week's *Mining Journal*.]

DISCOVERY OF A BRINE STREAM AT DROTTWICH.—At an early hour on Monday morning the workmen in the employ of Messrs. Noak, of this town, succeeded in tapping the brine spring, or river, at the new pit they have been sinking on Mr. James Greaves's premises, the Mitre. The supply of brine turns out to be abundant, and of very great strength. It is customary, when the rods used in boring touch upon the spring, for them to drop suddenly from 18 inches to 2 feet, but on this occasion they dropped to the extent of fifteen feet two inches—a depth entirely unprecedented; indeed, we believe, unapproached in the annals of searching for brine. The success of this experiment appears to give general satisfaction to the inhabitants of the borough, the trade of which has been so long languishing, and amongst other causes, not a little from the interruption or stoppage of works occasioned by the opposition of interested parties in cutting off the supplies of brine which had been obtained by rivals in the trade.—*Birmingham Journal*.

AN EXCELLENT CURE OF A DISORDER IN THE STOMACH EFFECTED BY HOLLOWAY'S PILLS.—A lady, an intimate friend of the family of General Rosas, Governor of the Republic of La Plata, declares that she was lately cured of a disorder in the stomach, and restored to perfect health by the use of this admirable remedy. She had consulted the most eminent physicians in the country, but had not been able to obtain any relief from the complaint that was killing her by inches, until she took Holloway's pills. John Eastman, Esq., an eminent merchant in Buenos Ayres, communicated these particulars to Professor Holloway in a letter, dated 4th Sept., 1849.—Sold by all druggists, and at Professor Holloway's establishment, 244, Strand, London.

THE BRITANNIA BRIDGE.—The operation of raising by the hydraulic machines the second monster tube, of 1800 tons, to its intended elevation of 103 feet above sea-level, was commenced by the engineers on Tuesday, 14 days only having elapsed since the day on which it was successfully floated. The action of the hydraulic process, from their perpendicular height in the towers, was found to be most perfect and precise, as in their first play on the stupendous mass communicating with the chains, it was worked steadily 6 feet upwards. Immediately after the bricklayers and masons entered the recesses of the towers, and built it up firmly beneath. The instant the masons left it, another 6 feet lift was taken, and in this manner the operation is being carried on without intermission day and night, during the latter period with the assistance of large lights and fans that illuminate this particular region of the straits. With about 15 more of these mighty lifts, should no unforeseen contingency occur, the tube will have attained its permanent level, and be joined on to the great twin tube in the Britannia tower. Every precaution has been taken, in the way of duplicate sets of machinery, by Messrs. Clark, the engineers of the works, who are in superintendence day and night. The greatest energy is being displayed in every department, and the majority of the workmen on the relay system have been engaged for some months from night to night. The first express train is expected to pass through in March next.

LAW EXPENDITURE OF RAILWAY COMPANIES.—Mr. Peter Macpherson, in a pamphlet just published, on this subject, points to the fact that the return made to the House of Lords of the law and Parliamentary expenses of 127 railway companies gives the following figures:—Law charges, 1,284,948*l.*; Parliamentary expenses, 3,303,461*l.*—4,588,409*l.* But this sum of upwards of 4½ millions does not include the law of some of the principal companies. The Great Western, the South Western, the Eastern Counties, South Eastern, Great Northern, Midland, York and North Midland, Berwick, Brighton, and others have not yet made a return.

FALMOUTH, HELLINGTONE, AND PENZANCE RAILWAY.—The winding up of this company's affairs came on, Thursday, before the Master in Chancery, Sir G. Rose, on the petition of Mr. Harvey, the promoter of the undertaking, which was projected in October, 1845, with a capital of 250,000*l.*, in 25,000 shares of 10*l.* each; deposit, 1*l.* 2*s.* 6*d.* Shares were allotted, deposits paid, and surveys made; but the panic put a stop to ulterior proceedings, and there are now outstanding liabilities to the extent of 5000*l.* Messrs. Turquand and Spiller were proposed for official managers, and creditors have been summoned to come in and prove debts, otherwise they will be precluded from prosecuting or commencing any proceeding for their recovery.

LONDON AND EDINBURGH DIRECT RAILWAY.—The Master in Chancery, Sir G. Rose, appointed Mr. Ewart, barrister, official manager, on Saturday, to wind up the affairs of this undertaking, which was projected with a capital of 1,500,000*l.*, in 75,000 shares, of 20*l.* each—deposit 2*l.* 2*s.* There were between 200 and 300 provisional directors announced by the acting committee to have joined the scheme from among the most eminent in rank and fortune. How far subscribers will be held liable to pay off outstanding liabilities, the prospectus of the company having stated that "no shareholder was to be liable beyond the amount of his subscription," will have to be settled by the Master, who will proceed with the question so soon as the official manager shall have made out a list of the contributors.

MADRID AND VALENCIA RAILWAY COMPANY—WINDING-UP ACT.—In the Vice-Chancellor's Court, on Thursday, two petitions were presented to have this company wound up. It was alleged that 106,000*l.* had been raised. The petitions were opposed for the directors, on the ground that the majority of the shareholders had, at a meeting, expressed their dissent from the proceeding. The project had been authorised by an ordinance of the Queen of Spain, and was not properly within the jurisdiction of the court. 30,900*l.* had been deposited in the bank, in the name of the Spanish Ambassador, and there was a clause in the deed of settlement, that one-third of the subscribers should be Spanish subjects. The undertaking was altogether Spanish, and governed by Spanish laws. They cited Story's *Conflict of Laws*.—The Vice-Chancellor said that, according to the prospectus, the affairs of the company were to be conducted by a board of directors in London, assisted by a committee in Madrid, and the offices of the company were in Moorgate-street. His Honour thought the case within the scope of English law, and made one order on both petitions, but said the costs of one only could be allowed. As there was some doubt as to which was first presented, the costs were reserved.

At a meeting of the directors of the Vale of Neath Railway, held last week in Cardiff, the question was put whether Mr. Brunel's services as engineer be continued or not, and the affirmative carried by one vote.

Mr. Locke's connection with the London and South-Western Railway Company will, it is understood, cease on the completion of the works which are at present going forward.

OXFORD, WORCESTER, AND WOLVERHAMPTON RAILWAY.—The Railway Commissioners have, through their secretary, Capt. H. D. Hargreaves, given notice to the directors of the Great Western Company, stating that numerous memorials had been presented to them, complaining of the inconveniences occasioned to the public, and individually, in consequence of the non-completion of the Oxford, Worcester, and Wolverhampton line of railway; that they had also considered the statements of the company; that they had not the power, under existing circumstances, to finish the line; that by the admission of the company, and by their own officers' inquiries, they find the company is neglecting to finish the line; and that there is no reasonable security when it will be finished. The commissioners, therefore, felt it incumbent on them to call upon the company to proceed with the construction of the line; and unless within one month from the date of the notice they have satisfactory grounds for believing the line will be finished in the time limited by the Act, they shall feel it their duty, *formally*, to require them to proceed with its completion.

GLOUCESTER AND DEAN FOREST RAILWAY.—It appears probable that the dispute between this company and the South Wales Company, which gave rise to the recent special meeting, will be adjusted. The question in dispute is one of some importance to the Gloucester and Forest of Dean Company, whose line runs into that of the South Wales Company about 5 miles from Gloucester, at a point some four or five miles distant from the Forest of Dean mineral field. Access to this is at present attainable by an old tramway, called the Bullo Pitt tramway, which has been purchased by the South Wales Railway Company, who undertook, in consequence of a "pressure from without," to convert it into a locomotive railway, and provide locomotive power, charging a maximum toll for conveyance of minerals of 2*d.* per ton per mile. That agreement, if carried out, would occasion considerable loss to the South Wales Company, and, therefore, they are seeking to obtain a modification of the terms. The directors of the two companies have had several meetings on the subject. In the meantime the works of the Gloucester and Forest of Dean Railway are progressing very satisfactorily, and will be completed by the time that the South Wales line is ready for opening from Swansea up to the point of junction with it. The erection of one of the bridges across the Severn, near Gloucester, has been begun. It is situated close to the "over" bridge on the west branch of the river, which here divides into two channels.

A correspondent of the *Derby Mercury* complains of the neglect of the Midland Railway directors in the development of their mineral traffic. The writer says:—"To connect these collieries, and to open the vast field of minerals up the Ripley Valley, with the Midland at Little Eaton, an Act has been obtained called the 'Ripley Branch.' Notwithstanding the manifest public advantage and local importance of this branch, it is said that the Midland directors have declined to make it, and have refused a guaranteed tonnage payment of 6 per cent. per annum upon their estimated cost of the branch of 26,000*l.* Can this be true? The directors being able to borrow at 4½ per cent. refuse to convert an opposing coal trade into a profitable traffic, yielding a secured 6 per cent. This Ripley branch seems to be under the ban of some indirect policy requiring to be explained to the satisfaction of Derby coal consumers and of Midland shareholders, who know the difference between guaranteeing and being guaranteed 6 per cent. upon a capital now paying 8 per cent."

FRAUDS ARISING OUT OF THE TRUCK SYSTEM.—Our readers will recollect that Messrs. Atterley were the contractors for the making the Nottingham and Mansfield line of railway, which has recently been completed. As is usual with persons engaged in extensive undertakings, they have been in the habit of giving the men in their employ numbers of tickets for 3*s.* and 5*s.* each, in part payment of their wages. These tickets, which were signed by the contractors' agent, John Sower, the men have taken to different tradesmen in the town, and have obtained goods for them. This practice has been carried on for some time past. These tickets have, this last week, been called in, for the purpose of paying the amount of them (somewhere about 6000*l.*) in cash to their holders. On this being done, it was discovered that about 1000*l.* worth were forged; and, as the contractors will not pay them, the loss in some of the cases will be very severe. No clue can be had as to who the forgers are. We cannot speak in too strong language against a system like this, whereby the poor man, because he wants a small advance of money, is made to pay nearly 20 per cent. for it.—*Nottingham Journal*.

SOUTH DEVON RAILWAY AND THE MAIL.—The arbitrator has just awarded the sum due to his company from the Post-office for carrying the mails. The amount to 11th of December is 26,000*l.*, and the sum payable for the service henceforward will be 36*l.* 4*s.* 6*d.* per day, or at the rate of 13,000*l.* per annum.

The dispute between the managers and engine-drivers of the Midland Railway has been amicably settled.

MASON-WORK IN GLASS.—Mr. C. H. Smith is doing some 14-in. glass slabs, 5 ft. by 4 ft., which were about to be laid in connection with pavement at St. Katherine's Docks; had not a fair edge to make a joint to, sought to have them made square by the dealer, and failing in that, successfully squared them with the chisel, in the same way as a piece of marble would be squared. Slabs might be divided by a plain-edged saw.—*The Builder*.

PROGRESS OF ELECTRICITY, AS APPLIED TO THE ARTS AND SCIENCES.

At the Society of Arts, on Wednesday week, Mr. Highton read an interesting paper "On the Application of Electricity as applied to the Arts and Sciences," which paper, and the discussion which ensued upon it, did not terminate until Wednesday evening last. It commenced by enumerating the results capable of being produced by currents of electricity—viz.: 1. The causing of matter to assume certain definite positions, or the production of a *directive* power.—2. The production of an *attractive* power.—3. The production of a *repulsive* power.—4. The production of positive or negative caloric.—5. The production of light.—6. The production of sound.—7. Chemical composition or decomposition.—In short, the production, in a greater or less degree, of all the other known forces in Nature.—The author then alluded to the fact, that every known substance on the earth was affected by the magnet, and assumed either the magnetic or diamagnetic condition. Mr. Highton then called attention to the various uses in the arts and sciences to which electricity had already been applied, commencing with the electric telegraph and the electrotype process. To such perfection had this latter art been brought, that a variety of specimens were exhibited in the rooms of insects and flowers, spiders, dragon flies, beetles, &c., converted, as it were, into metal, giving perfect *fac similes* of the living animal or vegetable. The mode of accomplishing this is not difficult, but requires caution. The animal, flower, or leaf, is steeped first in a solution of phosphorus, and then in one of nitrate of silver, instead of coating it with plumbago, which it would be impossible to perform completely on all the fibres and tissues. The phosphorus has the property of precipitating silver from the solution, and the metal is deposited in the most minute particles imaginable, forming a perfect metallic coat over the most delicate tissues. The specimen is afterwards electrolysed in the ordinary manner. When a sufficient deposit has formed, one or more minute holes are made in parts out of sight; and the body is placed in a sufficient heat to decompose the animal or vegetable substance, when a perfect metallic representation is obtained. Mr. Highton then alluded to a variety of other important uses to which electricity was and might be applied—such as measuring the temperature of water at great depths to the 100th part of a degree, determining the velocity of bodies to the 1000th part of a second, for illuminating and medical purposes, for testing the quality of air in coal mines, and for copying Daguerrotype pictures, a most beautiful specimen of which was exhibited to the meeting.

Mr. Highton then alluded to the application of electricity to the art of war, to the freezing of water, to the formation of hail, and to the ventilation of coal mines; and finished by showing that, from the fact of electricity differing from all the other known forces in Nature in its property of producing direct circular motion, it became a valuable analytical test for ascertaining whether certain other forces were simple and direct, acting in one straight line, or the result of a combination of forces acting in various directions. He concluded by applying this analytical test to the motions of the heavenly bodies.

Among the specimens upon the tables exhibited were iron tubes, covered with a mixed deposit of copper and cadmium, to supersede the so-called galvanised iron, or iron dipped in melted zinc. A splendid specimen of a solid silver salver was shown which had been deposited in a mould by the galvanic battery; and a *fac simile*, in solid copper, of a large vase, from the British Museum, and a gigantic head of Ajax, which had been precipitated in a similar manner, were on the table. Some beautiful specimens of intricate tracery-work, gilt and silvered in various proportions, were shown, the manner of executing which, Mr. Highton said, he believed was kept a secret in the trade; but a member afterwards explained that the parts not intended to take the silver were drawn over with shellac, dissolved in spirits of naphtha. After the silvering—as accomplished, the bituminous coat was removed by an alkaline or an acid solution, and the silver parts covered in like manner; the substance was then placed in the gold solution, when the parts exposed were gilt; and, on removing the coating from the silver, both would be found complete. Mr. Highton said that, in the early stages of the invention, the deposited metal was found very soft; but Messrs. Elkington had told him that they can increase the hardness in proportion to the intensity of the galvanic current; and they had obtained silver, by electro-deposit, of a harder texture than could be obtained by any other means. With respect to the delicacy of depositing metal on fine tissues, he might mention that a friend of his (Capt. Ibbotson) was now engaged in electrolyzing a spider's web.

Mr. Highton then described his theory of the formation of hail on a hot summer's day. He could not subscribe to the ideas of Volta, that in thunder storms there existed two layers of clouds, in different conditions of electricity, and a drop of water falling from the upper to the lower was instantly repulsed and thrown up again; and, by this repeated action, it became converted into ice, and fell to the earth.

Although during thunder and hailstorms, there were often two or more series of clouds floating in the air, and in opposite electric conditions; yet they were continually seen forming junctions, and merging into each other. As the vapour in these clouds condensed, drops of water formed, and increasing in size by contact with each other, as they fell towards the earth, and increasing in velocity, by two powerful agents acting in one direction—viz.: their own gravity, and the attraction of electricity—they give off a quantity of vapour, which, reducing the temperature of the remainder of each drop, converts it into ice, and it falls in the shape of hail. As an illustration of this formation of ice in an atmosphere so much hotter than itself, he called attention to the now well-known experiment of forming ice from sulphurous acid and water, in a red-hot crucible.

An interesting discussion ensued. Mr. Vaux said, that on one occasion, with some scientific friends, he ascended a mountain during a heavy storm. Regardless of the physical inconvenience of getting wet, they persevered in their object. At first the drops of rain were very large, but as they ascended they found them gradually decrease in size, till at a considerable elevation they found themselves in a perfect vapour, such as is generally termed a Scotch mist, but intensely cold, which he attributed to the sun's rays above evaporating the upper surface of the cloud, and, consequently, abstracting caloric from that portion in which they stood.

Mr. Webster coincided in Mr. Highton's views of the formation of hail, but as the original causes of these phenomena must remain, to a great extent, matters of speculation, he wished to call the attention of the meeting back to the practical part of the subject. Mr. Highton had stated silver could be obtained more compact by the electrolytic process than silver under any other circumstances; he thought it would be highly interesting if some gentleman would further experimentalise, and ascertain the specific gravity of silver under these different circumstances.

Mr. E. Hunt, of the Museum of Economic Geology, made a few observations. He said it should be borne in mind that the precious metals were deposited in a granular state, and, when finished, presented a surface of dead, or frosted silver, or gold, and, when required bright, must be burnished; but if a small portion of sulphuretted carbon was added to the solution, a deposit would be obtained nearly as dense as cast metal, and required but little polishing. Could Mr. Highton throw any light on the rationale of this singular action?—Mr. Highton said, at present he had not sufficiently considered the subject to say he could.

Mr. Hunt continued: It had been laid down by Faraday, that for every atom of zinc destroyed in the battery an equivalent of silver was deposited in the solution vessel. But Mr. Elkington had informed him that, by the addition of sulphuretted carbon, he could obtain a much larger amount of deposit than an equivalent for the zinc lost. A friend of his, Dr. Broad, had, for the last five years, devoted his time and energies to the obtaining electrolytic copies of ancient works of art in the Vatican at Rome, and other interesting ancient relics in different parts of Italy, with the view of getting them multiplied *ad infinitum*, and thus be obtainable at a cheap rate by the artisan and mechanic. This was a highly praiseworthy devotion, and would tend greatly to moralise the working man, and elevate the public taste. With respect to the application of electro-magnetism as a motive power, which had been alluded to by Mr. Highton, there were many difficulties of a serious nature to overcome, before it could be made available, particularly the decrease of magnetic power, as the distance from the object increased but a few lines, and from the fact that a current of electricity was induced in the metal, by its motion running in a contrary direction to the current which caused the magnetism—a serious loss of power, and which increased with increase of velocity. The most ingenious mechanical arrangement he had yet seen for applying this power, and obtaining length of stroke, was Mr. Horth's electro-magnetic engine, which gave a stroke of 18 inches. He had been for a very considerable period going through

a series of experiments in galvanic electricity, particularly the deposition of metals, and he should request permission of the society, at a future day, to read a paper on the subject.

The CHAIRMAN said, the society would feel greatly obliged to Mr. Hunt for a description of his experiments and their results.

On the previous Wednesday evening a vote of thanks was passed to Mr. Highton, for his interesting paper; and at the conclusion of the discussion a similar vote was proposed by Mr. Newton to Messrs. Elkington, of London, and Mr. Collins, of Birmingham, and Capt. Ibbotson, for the loan of the magnificent specimens exhibited on the table, which was carried unanimously, and the meeting, which was crowded, separated.

INSTITUTION OF CIVIL ENGINEERS.

DECEMBER 18.—JOSHUA FIELD, Esq. (President), in the Chair.

The annual general meeting of the institution was held on Tuesday evening, December 18th, when the following gentlemen were elected to form the council for the ensuing year:—William Cubitt, president; T. K. Brunel, J. M. Rendell, J. Simpson, and R. Stephenson, M.P. vice-presidents; J. F. Bateman, G. P. Bidder, J. Cubitt, J. E. Errington, J. Fowler, C. H. Gregory, J. Locke, M.P., L. R. M'Clean, C. May, and J. Miller, members; and J. Baxendale and L. Cubitt, associates of council.

The report of the council, which was read, alluded to the past season of unexampled depression in the engineering world, but at the same time held out hopes of improvement, on account of the agitation of the subjects of better supplies of water and gas, the sewage and drainage of towns, the construction of abattoirs, and other sanitary questions; whilst the improvement of canals, in their struggle with the railways for the heavy traffic, the construction and amelioration of harbours, the embanking and improving of rivers, the recovery of marsh-lands from the sea, and numerous other works, which had been neglected on account of the more attractive railways, would resume their former importance, and eventually afford ample employment for the majority of the members of the profession.

It was shown that the careful administration of the funds had been attended to, and that a considerable quantity of publications had been issued.

The alteration of the commencement of the session was shown to have worked well; and, in general, the report of the progress of the society was very satisfactory, in spite of the bad times for engineers.

The debt contracted for the improvement of the house of the institution was stated to have been entirely liquidated, by the liberality of the members.

Telford medals were presented to Lieut.-Col. Harry D. Jones, R.E., Mr. R. B. Dockray, and Mr. J. T. Harrison; council premiums of books to Messrs. J. T. Harrison and J. Richardson; and Telford premiums of books to Messrs. R. B. Grantham, T. R. Crampton, W. Brown, and C. B. Mansfield; the president addressing a few complimentary expressions to each of these gentlemen on presenting the premiums.

Memoirs were read of the following deceased members:—Messrs. J. Green, P. Rothwell, R. Sibley, and D. Wilson, members; A. Mitchell, Lieut.-Col. A. W. Robe, R.E., C. K. Sibley, W. Mitchell, and J. C. Prior, associates; and J. Woods, graduate. The following extract from the memoir of Lieut.-Col. A. W. Robe, will give a specimen of the manner in which civil engineers treat and speak of the memory of their deceased brethren, whether civil or military:—

"Lieut.-Col. Alexander Watt Robe, R.E., was born at Woolwich, on the 31st of January, 1793; he commenced his military career as a gentleman cadet, at Great Marlow, removing from thence to the Royal Military Academy at Woolwich, and obtained a commission in the corps of the Royal Engineers, in 1811, finally attaining the rank of Lieut.-Col. in that distinguished corps, in 1837. By a remarkable combination of circumstances, although he was continually appointed for active service, his appearance was generally the harbinger of peace. He joined the army of the Pyrenees in 1813, just before the termination of the war in the Peninsula; and in 1814 was attached to the forces under Sir Edward Pakenham, in the expedition to New Orleans, but only arrived at the cessation of hostilities. Immediately on his return to England, he received orders to re-embark for the Netherlands, but only reached the seat of war a few days after the battle of Waterloo. He remained with the army of occupation until 1818, and shortly after his return was appointed to the Ordnance Trigonometrical Survey, the duties of which post he performed with great skill and ability, until 1844, when he proceeded to Halifax, Nova Scotia, as second in command of the Royal Engineers; and in 1845 was appointed commandant of the Royal Engineers at St. John's, Newfoundland, in which command his honourable and useful career terminated, with his valuable life, on the 2d of April, 1849, which was shortened by disease, originating in over-exertion on the survey on the north of Scotland, and aggravated by fatigue during the great fire at St. John's, where he toiled incessantly for 48 hours, in protecting the lives and property of the inhabitants.

"Colonel Robe was descended from a line of ancestors who had all been in the military and naval services; his four brothers were also distinguished officers, and two of them fell gloriously in the service of their country. He was devotedly attached to scientific pursuits, and was eminently useful in promoting the object of the societies which he joined, and for this his mathematical acquirements and topographical knowledge, peculiarly qualified him. He was elected an associate of this institution in 1838, and served on the council for some years with great zeal and attention, being continually present at the meetings, and inducing the frequent production of original papers, or presents of charts, &c., for the collection. In the performance of his military and civil duties, his zeal and ability were unbounded; as a son, a brother, and a friend, he could not be surpassed; and the public estimation in which he was held, was fully testified by the general mourning for his loss, at St. John's, Newfoundland, where he died; and where it was said of him, that it seldom fell to the lot of a military man to be so beloved by civilians. The most creditable respect and esteem was the active and untiring benevolence of his character, which was only equalled by his unassuming manner; and the frankness and mildness of his demeanour; and the highest eulogium that can be paid to those who knew him best, esteemed him most.

The thanks of the institution were voted unanimously to the president, vice-president, members, and associates of council, to the auditors, scrutineers, and the secretary, for their attention to the interests of this institution.

The PRESIDENT returned thanks very briefly, and, on retiring from the chair, after holding it most worthily for the two past years, he recommended to the members his successor, Mr. Cubitt, whose active energy and high position in the profession, rendered him every way fit to occupy the chair of such a society.

The address was very warmly received, and it was proposed to the council to consider by what means the eminent past presidents could be enabled to continue their valuable services, in conjunction with the acting council.

The meeting was adjourned until Tuesday, January 8th, when the following papers were announced to be read:—"An Account of the Blackfriars Landing Pier," by F. Lawrence; and "A Description of a Timber Pier, erected on the line of the Lyant and Ely Railway," by J. S. Valentine, Mem. Inst. C.E.

CHARGES AGAINST THE DIRECTORS OF THE LONDON AND SOUTH-WESTERN RAILWAY COMPANY.—A lengthy address was circulated, on Thursday last, by Mr. Chaplin, the chairman of this company, anticipatory of the special general meeting to be held this day, when the directors themselves propose to have a committee formed for the purpose of enquiring into certain charges which have been promulgated against them, and the chairman, individually. It states, until lately the directors possessed the unlimited confidence of the shareholders; but, from the recent depression in their property, over which they had no control, unjust suspicion and distrust was first engendered, which eventually broke out into open charges, which have no foundation in truth. Mr. Chaplin candidly enters into an historical statement of his connection with the company since 1837, relinquishing one of the largest coaching businesses in the world, and withdrawing his property from every other investment, in order to devote both it and himself, from that period to the present time, to the interests of the South-Western Railway, to the exclusion of every other English investment. After drawing attention to the gradually increasing extent of the company and its capital, and to his own co-ordinate holdings in it, Mr. Chaplin proceeds to deny that he had ever, at any period, withdrawn any of his investments, or trafficked in shares, but had held on with steadiness and constancy. He states his total present holding in the company to be as follows—viz., stock paid, 19,120*l.*; new shares, 1845, 50*l.*; No. 2995, 95,948*l.*; 40*l.*; No. 271, 7046*l.*; thirds, 1846, No. 6841, 58,015*l.*; preference, 1848, No. 2297, 11,085*l.* Total paid, 194,974*l.* He states that he has been, and still is, in arrears of calls, but is not aware that the company's interests have really suffered thereby; and that more mischief would have been done had he been a considerable seller. The arrears, excluding optional calls, amount to 48,245*l.*, and consist of two calls of 6*l.* on the new shares of 1845, and two of 1*l.* 18*s.* 4*d.* each on the thirds of 1846-7. These latter arrears have not been written off or transferred to a ledger account, but stand simply against his name as arrears, bearing interest at 5 per cent. However erroneous many of the charges may be, there is ground for complaint that so large a sum should be in arrears of calls, although a per cent. interest is charged upon them. If 10 directors are all in the same predicament, an arrear of nearly half-a-million sterling would be the result, a sum sufficient to paralysise any company. It is the more to be complained of, as the smaller and less wealthy proprietors are by no means spared being urged to pay calls. Knowing what has transpired in other places, we think a committed highly desirable for the satisfaction of all parties.

CORK AND BARDON RAILWAY.—It appears that the Exchequer Loan Commissioners have agreed to advance 35,000*l.* to this company, on condition that the contractors perform work to the amount of 23,000*l.* before the first advance of 10,000*l.* be made; that the tunnel at Goggin's hill be made wide enough for a double line of rails; and that the additional sum of 5000*l.* required for that purpose be raised by the disposal of forfeited shares.

BY J. Y. WATSON, ESQ., F.G.S.

NORTH ROMBEAR.—In 140 shares; price 160*l.*; paying small and irregular dividends; but a good old mine, and likely to do much better, especially with a good price for copper. The dividends paid this year amount to 8*l.* per share, or about 5 per cent. on the price.

[To be continued in next week's Journal.]

BRITISH MINES.

mouth of the end), but nearest to it, is a very much improved one. The ground in the 110 km. level cross-cut south, towards the Backpack lodge, is not quite so favourable as we have seen it; there is more hard spar mixed up with the limestones than usual. However,

cross-out is at three very bad. I hope it will be made all right in about five weeks from this time. The tribute pictures, on the whole, are much the same as they have been for some time past. The standard sold on the 11th net for 734.14c. Id.

WHEEL VINCENT.—We are daily expecting to cut the north lode at the old one-half. We have this morning cut a large quantity of ore, and to drive our wheel much faster. We expect we are within a few feet of the lode. The ground is soft, yet not expensive for timber. We have taken down the lode to the west of No. 3 shaft, and found it to produce very good work for tin. In stopping between the engine and No. 2 shaft, the water is producing fair work for tin. In sinking the lode at No. 2, I am very happy to find it producing fair splinter work, and is completely free from wolfram, and is now, in sight, worth 30¢ per fm. Next week we shall be in a position to sink a winze in the bottom of the level where we broke the large stone last sent; here we consider the lode to be worth 30¢ per fm. All our other workings are in a position to produce good work, and are not much troubled by the weather. Our surface crusher, &c., will be completed in a few days.

ALTEN MINES.—Estimated produce for October:—

Mines.	Tons of Ore.	Per Cent.	Fine Copper.
Ralston	66	8 1/2	5-6
Old Mine	35	6 1/2	3-4 1/2
United Mines	18	6	1-2
Michell's	25	7	1-2 1/2
Mancusa's	2	5	0-10
Ryder's	1	6	0-6
Carl Johan's	3	12	0-35
Quinn's	3	12	0-35
Total	176		12-96

Mining Report from the 15th October to the 5th November

Tungtill, Ready Creek Mine, Aug. 31.—I am happy to inform you that the mine generally continues to look well, and is producing the usual quantity of ore, and, I think, of higher per centage; the lode in Goad's stope is very good, also in the 40 north from the cross-cut, near Masterman's, on the side lode. In the winze under the 40, between Richard's and Harter's cross-cuts, on the side lode, we have now sunk 5 fms. where the

... might come away, and the men's lives be thereby endangered. The gratifying result of these energetic precautionary measures will appear from the following report:

EAST POOL.—A meeting of adventurers took place at the mine on Tuesday morning, when the accounts for October and November were produced and allowed. **Following**—To balance from last account, 194*l*. 13*s*. 4*d*.; costs and merchants' bills, 1250*l*. 17*s*. 11*d*. = 1445*l*. 11*s*. 3*d*.—By ores sold (less dues), 819*l*. 14*s*. 6*d*.; sale of materials, 1*l*. 10*s*.; two months' water drainage, 120*l*. = 941*l*. 4*s*. 6*d*.: balance against the mine, 504*l*. 6*s*. 9*d*.

TAMAR MINES AND SMELTING WORKS.

Sir,—I was surprised to read in your paper of last Saturday that the Tamar line and Smelting Works were making a profit of 1000*l.* per month, &c., although they are working very satisfactorily, and likely to continue paying regular dividends, the profits at the present time cannot be estimated at much more than one-half the sum mentioned, which I state to prevent any misconception.—P. STAINBY: *Salvador-house, Dec. 20.*

The number of passengers who passed through the Tunnel in the week ending Dec. 15, was—No. of passengers, 17,343. —Amount of money, £72 5s. 3d.

NOTICES TO CORRESPONDENTS.

* We must impress upon our correspondents, the necessity of invariably furnishing us with their names and addresses—not that their communications should, consequently, be noticed, but as an earnest to us of their good faith.

J. Richards (Goldsmith).—We unhesitatingly state the particulars of a case detailed by our correspondent, as being one of those unpalatable "tricks" of sharebrokers, which tends to bring the whole system of mining into contempt and derision, and, in former years, so effectively prevented many capitalists and other parties, wishing to make legitimate investments, having anything to do with mines; we hesitate in publishing the name of the broker, in the hope that satisfactory atonement may be made. It appears that, on the 14th July last, Mr. Richards was in London, on which day Mr. R. Dyer, of Cornhill, joined him in purchasing 5-1094ths shares in Alfred Consois Mine, for which they gave the broker a bill at three months for 50l. The notice of transfer did not reach the pursuer until the middle of August, when it was returned, because there were no shares standing in the broker's name in the cost-book of the mine. On the 6th October, Mr. Richards remitted 25l. to Mr. Dyer as his share of the bill of exchange due on the 17th, which the latter gentleman acknowledged, stating that the broker would communicate as to the transfer, and that he wished Mr. Richards either to sell his odd half-share, or buy another, to make the transfer even. Mr. Richards agreed to take another half-share at 3l. 15s., and on the 15th November the broker wrote as follows:—"Herewith I enclose you a transfer of three shares in Alfred Consois, receipt of which please acknowledge, and remit me the amount, 3l. 15s." On presenting the transfer to Mr. Noel, the pursuer, he again refused to receive it, because the name of the broker pretending to be in a situation to transfer shares was not in the cost-book; and, naturally indignant at such treatment, Mr. Richards wrote to the broker firmly, on the 24th November, and again on the 8th December, to neither of which letters he received any reply; and he now submits the case, hoping it may operate as a caution to the public, who may fall in with such managers in the shape of mine sharebrokers. As in the best mode of proceeding, Mr. Richards' own solicitor in Cornwall could commence an action, which would be carried on, if defended, by his London agent, and the presence of the plaintiff is not necessary. There can be no doubt of the result, if defendant be hardy enough to allow the matter to be carried to trial; but we should like to see whether a magistrate would not grant a warrant for receiving money under false pretences (for such the case really is); and, under all the circumstances, the broker well deserves all the punishment and exposure which the law can inflict for such description of felony. It is a breach of confidence and good faith, which cannot be too severely reprobated.

"H. J."—Newbury's liquid glue is a good cement for the purpose; it can be obtained in bottles, ready for use, at most chemists and oil-shops. The white of an egg, mixed with fresh burned quicklime, is a very strong cement for marbles, minerals, &c.; and see a list of cements in the *Mining Journal* of 5th May last.

"J. R. L."—On application to the inventor, he would furnish a drawing and description of the invention.

"Inquirer" (Pall Mall).—The report was issued in New York, and can be obtained of any of the agents of the American bookellers.

"A Shareholder" (Manchester) had better address some of the parties interested in the Valley of Loetchen Mining and Smelting Company, who can better enlighten him respecting the value of shares, or where they are to be obtained, than we can.

"T. E." (Tredgar).—Crucibles can be obtained of Messrs. Knight and Co., Foster-lane, City; they are sold in Redruth at the price of 1s. 6d. and 2s. per dozen.

"M. G. S." (Swansea).—The specific gravity of coal varies very considerably, according to its component parts and qualities. Both the authorities quoted are considered correct.

"D." (Brymbo).—The provincial paper, said to have been forwarded us, with a description of the means used by Mr. Goldworthy Gurney to extinguish the fire at the Westminster Colliery, has not come to hand. We have examined all the Welsh, Chester, Herefordshire, and other neighbouring journals, but cannot find any allusion to the subject, further than what our own columns recorded on Saturday last.

* It is particularly requested that all communications may be addressed—
To the Editor,
Mining Journal Office,
26, FLEET-STREET, LONDON.

And Post-office orders made payable to Wm. Salmon Mansell, as acting for the proprietors

THE MINING JOURNAL

Railway and Commercial Gazette.

LONDON, DECEMBER 22, 1849.

The *MINING JOURNAL* is published at about Eleven o'clock on Saturday morning, at the office, 26, Fleet-street, and can be obtained, before Twelve, of all news agents, at the Royal Exchange, and other parts of London.

We are at length arrived at that advanced season of the year when it involves little difficulty, and no danger, to characterise generally the mining and commercial results of the entire period. Undoubtedly we are a sanguine, an ardent people, and we are too apt to calculate the favourable contingencies of the future, to the neglect of those which are not favourable; so much so that, when what was recently the future has become present, our horn of plenty is less full, and our chalice less luxuriantly overflowing than, when we looked forward to their various points, we believed they would be. It is the rule of all life, and all experience, that we realise less success than we bargained for. We think, however, that the commercial and mining success of the year, whose last waters are now flowing out, are instances not belonging to the rule, but to the exception; for, in mining affairs especially, we think it may be said very confidently, that we are now in circumstances as satisfactory, and as auspicious, as was either purposed or expected. We have, on other occasions, pointed out the improving steadiness of prices as to the produce of our home mines generally; and, although the rich mines of the colonies, and of Spain, have sent their superior ores very freely into the European market, we have kept our place, and obtained our prices, quite as well as, considering the change, the stock, and the competition which had become inevitable, we could, in any sense, expect to have done.

We should say decidedly we have turned the corner; we have weathered that stormy headland, which, in the course of our mining navigation, we must, some how or other, have doubled; and we are now, as we believe, getting into a more genial climate, and into fairer winds. The improvement, both in the foreign commerce and in the domestic trade of the kingdom at large, has throughout the year been constant and remarkable. The exports of manufactured goods and of articles of British produce have exceeded those of the preceding year by about 10,000,000l. sterling. We leave trade—that is, foreign countries—our debtors to that extent, beyond what we made them in 1848. We must have, therefore, 10,000,000l. worth of their produce, merchandise, or specie, put into our hands to balance the account. We have, by this means, turned almost all the foreign exchanges in our favour. The average price of wheat is not over 45s. a quarter; and the probability is, as we think, that we shall have still cheaper food, and so lower the cost of all our produce, as to increase our profits, or indefinitely to enlarge our sales. By either means we shall fully occupy the working classes of the kingdom, and fill, as we hope, their winter homes with plentifulness. The more fully to accomplish these high purposes, there exists in all the great centres of business an accumulation of capital, if not absolutely without precedent, yet greater than is at the command of any contemporary nation whatever, far or near. In the metropolis there is a positive congestion of wealth, and the question with almost every holder is, how shall I dispose of my surplus?

It were, for a thousand reasons, to be wished that there were a more general and popular distribution of this great public store—that the possessors of too much had less, and those whose lot is to have too little had more; but we cannot, and ought not, to wish to interfere with the order of Nature, or the course of Providence, in such things, and for such objects. Our true duty is to make a full and honest use of our opportunities—to prosecute our mining undertakings, if possible, with greater skill and economy—to enlarge the area of our markets, and, by our diligence and integrity as a working people, to contribute to the further consolidation of that great empire, whose shores may be seen stretching throughout every zone, and sheltering, within their spacious limits, as in these islands to a happy extent we do, a prosperous and a contented people.

A considerable agitation is getting up among the iron manufacturers of the United States, with the view of inducing Congress, in the next session, to modify the present tariff as to the duty on the importation of British and other foreign iron; and although the present rate of 30 per cent. they consider sufficient for protecting the interests of the trade, they contend that it ought to be specific, or so much per ton, instead of an *ad valorem* duty, as at present levied. Under this mode of levying the duty, they contend that when to-

reign iron is lowest, and they need most protection, they actually have the least, and that when the foreign markets are high, and they, consequently, require no protection, they get the most. Whatever alteration may be made in the mode of levying the duty, one thing is certain—that with all the bombast indulged in by some of the Journals of the capabilities of America to supply her consumption from her own mineral deposits, they cannot do without British iron, and the time is far, very far, distant before they will. In support of this assertion, we have only to refer to the quantity of foreign iron imported into the port of New York alone in the half-year ending 1st Sept. last, which was 112,010 tons, of which 105,914 tons were British iron, in bar, pig, rails, refined, hoop, band, and sheet, the remaining 6996 tons being Swedish, Russian, and Norwegian, showing an annual importation of two millions and a quarter of tons. The entire cost of these imports was \$4,155,480, or 831,096l. sterling. The cost of the British iron alone was 525,449l., with freight, duties, and other charges, 793,983l. The ironmasters of Western Pennsylvania, in complaining of the alteration of the tariff of 1842 in 1846, state that in the four years between those periods that 75 new furnaces were erected, and that since 1846 only three have been brought into use. These 75 furnaces probably yield 175,000 tons annually; so that with the increase of population and, of course, of consumption, other 75 furnaces, at the least, are required to meet the home demand; while, for the past three years only one a year has been built. A correspondent in the *New York Journal of Commerce* suggests a sliding scale of duties in lieu of the proposed tonnage dues; he proposes to take a central standard point of value, D, at about the present invoice price of iron, or one that yields a fair return for investment, with a rate of duty of 30 per cent. When the price of iron sunk to E, the duty to raise to 35 per cent.; to F, 40 per cent., and so on. If the price rises to C, the duty to fall to 25 per cent.; to B, 20 per cent.; to A, 15 per cent. This would guard the consumer against an increase of price, and would keep the remuneration constant to the manufacturer. In noticing the subject, in our last Number, we stated that a convention of furnace-owners of Pennsylvania, Ohio, Virginia, and Kentucky, had been held at Pittsburgh, at which it was decided that a duty of \$10 per ton on pig, and \$20 on bar-iron was required to protect the American iron trade; and we now further understand that the meeting was largely attended also by delegates from Illinois, New Jersey, and New York. After an address from the Hon. A. SHERRON, in which he maintained that, without a change from the *ad valorem* system to specific duties, the whole business of iron making in the Union must be given up, resolutions were passed to the effect that the *ad valorem* duties, though sufficiently protective at the time they were passed, were not so now; that they gave protection only when it was not required, and withheld it when it did; that nearly all the value attached to iron is derivable from labour, and that the Union is abundantly able to produce the largest quantity its consumption could demand; that while the convention did not wish to prohibit importation by heavy duties, it was considered sound policy to lay such restrictions on foreign iron as would prevent ruinous and sudden fluctuations. A committee of correspondence was appointed to publish written addresses all over the Union, and draw up petitions, to be signed by the people, and presented to Congress at the next session.

A subject of still more importance to the iron manufacturers in England is, we consider, the continual complaints reiterated in the American papers of the inferiority of British iron imported into the United States, with what degree of correctness they are best able to tell. The *Harrisburgh Union* says—

The Harrisburgh and Lancaster Railway Company are now having delivered at our wharves, and along the line of their new road, some 2000 tons of Danville (T) railroad iron; for which, we learn, they pay \$50 per ton at Danville. This company purchased, lately, 1000 tons of English iron, at about \$48 per ton; but upon a comparison with the Danville iron, which they had formerly used, they determined that in the end the American iron, at \$48 per ton, was decidedly the cheapest article to the company. A great portion of the English iron now brought into this market is cast-iron, while the American railroad iron is so tough that it cannot be broken. In *prices*, (from *prices*.)

And the Philadelphia Ledger says—
The English iron, we have understood, that is afforded here to our railroad companies at \$50 per ton, has been found so inferior in quality, as to be deemed that the domestic manufacture is at \$50 per ton—and the probability is that a trial of two of the foreign low priced article will prove what is now asserted, and its use be abandoned for our own cheaper, though higher priced article. Those who have been asking an increase of the tariff, in order to shut out foreign competition, will see, from this, that the difficulty complained of is not in the tariff, and that the British cannot now, under the present rate of duty of 30 per cent., put into market iron of equal quality, at a price lower than it can be made here with profit. It is not desirable that the duties on iron should be so high as to raise the price on consumers, merely to redress the losses to those engaged in the domestic production. All unnecessary taxing should be avoided as far as possible.

There is, no doubt, some exaggeration in these statements, as we cannot believe but that much good iron is exported to America from England, as well as elsewhere; and knowing, as we do, that railroad iron has been supplied here at 5l. represented as best bar, which could not possibly, without loss, be rendered under 7l. 10s., we cannot be surprised that some rubbish, called best rails, should find its way across the Atlantic.

The suggestion for the Grand Exhibition of all Nations, as promoted by PRINCE ALBERT, and proposed to take place in 1851, will, in all probability, arouse a degree of public spirit and commercial pride hitherto unexampled in this or any other country. Foremost as the people of England ever have been, when urged to great and unusual consummations, whether in the cause of humanity, of political regeneration, or commercial and scientific advancement, there are indications in the gradual progression of circumstances connected with this grand universal exposition, that they will, on this occasion, surpass themselves. An agreement, perhaps, unprecedented as a commercial speculation, and which, indeed, has been undertaken more on the morality and good faith of his Royal Highness and the other parties concerned, than from dependence for security upon strict legal documents, has been entered into by Messrs. JAMES and GEORGE MUNDAY, the contractors for public works, receding the proposal of PRINCE ALBERT, as President of the Society of Arts, to institute a grand exhibition in 1851, at which prizes to the value of at least 20,000l. shall be awarded, anticipating that a large amount will be raised by public contribution. As, however, it is quite uncertain whether the sum will be sufficient to pay such prize money, and the expenses attending the exhibition, the Messrs. MUNDAY have actually agreed to advance the 20,000l., which sum was paid, together with 500l. towards the preliminary expenses, in August and Oct. last respectively, to Messrs. LE NEVE FOSTER, JOSEPH PAYNE, and T. WICKWORTH, the treasurers of the exhibition fund. They have further agreed to provide all such monies as the executive may require, not exceeding 500l. per month, up to Nov. 1, 1851, and further bind themselves, after the close of the exhibition, to pay all expenses, so as to indemnify the society from pecuniary responsibility. If the subscriptions exceed 30,000l., further sums of money may be set apart for prizes; the surplus, if any, after payment of the prize money, is to be appropriated to the repayment of Messrs. MUNDAY; all the money advanced, with interest at 5 per cent., and any residue after such payment, is to be divided—two-thirds to the contractors, and one-third to the Society of Arts. The indentures of agreement, of which there are two, contain a variety of details for carrying out the proposed exhibition in a style commensurate with the undertaking; and, from the above remarks, it will be seen that, if there is not sufficient receipts to cover the advances made, Messrs. MUNDAY must sustain the loss; and there is a proviso that if they fail in any part of their contract, they lose the 20,000l., the 500l., and any further sums which they may have advanced; while if there is a surplus, in addition to the repayment, with interest, they receive two-thirds of it, subject to a deduction for a proportion of the expenses; while the treasury of the Society of Arts will benefit by the remainder. We heartily congratulate the society on this highly advantageous contract; and think the public spirit displayed by the contractors is above all praise. The amount risked, on a gigantic and novel undertaking, is large; and, although there is little doubt the subscriptions will amount to a considerable sum, it is by no means certain that they can be repaid. We hope,

however, and believe, that not only will such be the case, but that there will be such a surplus fund as will amply compensate them, in addition to repayment, for the risk, perseverance, and anxiety, inevitably attendant on such an undertaking. The exhibition is to be advertised as that of the Society of Arts, without mentioning the names of Messrs. MUNDAY; and, until the appointment of a Royal Commission, an executive committee will manage the arrangements and control the expenditure. It will consist of Messrs. HENRY COLE, ROBERT STEPHENSON, FRANCIS FULLER, and C. WENTWORTH DIXIE, together with Mr. GEORGE DREW, the nominee of Messrs. MUNDAY, to watch their interest in its decisions. We understand that a Royal Commission, for inquiring into the best mode of carrying out the Exhibition of Industry of all Nations in 1851, will shortly be issued, and is likely to consist of heads of parties and interests, members of the present and late administrations, representatives of agriculture, art, science, mechanics, and manufactures. It is proposed, in addition, to nominate any number of local commissioners desirable, to represent all interests both at home and abroad. The outline of the exposition has now taken a tangible shape; and we believe the very highest expectations which could be formed, will be more than realised.

Hitherto the progress of this great national undertaking has been marked with the most gratifying unanimity, and responded to in a most cordial spirit, in every locality where it has been brought forward for discussion; it is, therefore, with deep regret that we can find any cause for dissatisfaction where all appeared so promising. Since the above remarks were in type, we have been furnished with the concluding portions of some correspondence which has taken place between the private secretary of PRINCE ALBERT, as president of the Society of Arts, and Mr. DREW, the nominee of the Messrs. MUNDAY. It appears that, after all the preliminaries had been settled, and the deeds in fact drawn, the following minute of a meeting of the executive committee was entered:—

"The PRINCE inquired, whether Mr. COLE was ready to report on the willingness of the contractors to place a limit on their profits?—and was informed that they had stated they were disposed to entertain at all times any wishes of his Royal Highness, and to refer them to arbitration."

A copy of this minute was forwarded Mr. DREW, with a request that the contractors would transmit, in writing, an agreement, that the council of the society should have power to determine the contract by arbitration on the 31st of March next, or at any time his Royal Highness may think desirable. Now, this is really too bad, and shows a spirit of meanness, illiberality, and cupidity at work somewhere, which, if left to rule paramount, will tend to the undoing of all that has been hitherto so happily accomplished. In July last, when all was mere conjecture and chance, as to how the scheme would be received by the public, Messrs. MUNDAY came forward in an almost unexampled spirit of liberality, and offered to risk 75,000l. on the success or otherwise of the experiment; and the society were but too happy thus to be able to offer the magnificent sum of 20,000l. in prize money—themselves secured from all risk; but finding that the proposal has been responded to in a manner very different from the ideas some had formed of British munificence in the cause of science, after the deeds are settled, and the society itself, from its third of the surplus, tolerably certain of a good fund as a reserve for future similar expositions, turns round upon the contractors, and require them to give up their two-thirds, and have their profits left to be decided by arbitration. We can scarcely trust ourselves to write under the circumstances, which, as we said before, we deeply regret. Messrs. Munday have agreed to the wishes of the council and the Prince, which is another proof that their object is more the furtherance of science than mere gain. From Mr. DREW's reply, with an extract of which we conclude, it is, however, evident he felt the injustice of the request; he says—

The contractors admit the full force of the fact that the undertaking now appears under an aspect very different from that which it wore in July last, when it was first proposed by your Royal Highness. At the same time, the contractors submit it should be borne in mind, in considering their position, that, before the proposition for holding the Exhibition, accompanied with the offer to the world of prizes to the amount of 20,000l., could be published, it was obviously necessary that there should be some guarantee that the Government, the Society of Arts, or some one, must have taken the preliminary risk before any public steps whatever could be taken, and the contractors, for certain considerations, were then willing to undertake that risk. If a contract had been made now, in the month of December, for the first time, the present information as to the expression of public feeling might, perhaps, cause the terms of that contract to be different. The contractors, however, do not wish to take advantage of the state of uncertainty which existed in July last, and are willing that the better knowledge and experience in this matter, which have been obtained at their risk and by their expenditure, should be fairly considered. But in so doing, I submit that the circumstances of the early period when the agreement was made ought not to be forgotten. It is only then that we can see at all to indicate how far the public would respond to the proposal; and there was no guarantee whatever to secure its eventual success, as indeed there is none certain even now. The contractors were invited to enter into an engagement, binding themselves to carry out this great work, involving a certain liability of 75,000l.—to be prepared at once when called upon to deposit 20,000l., for a prize fund—to advance all necessary capital for preliminary expenses—not to make an output at once, but to wait until the public had given security whatever. If they had viewed this proposal simply as a business transaction, they would probably have declined it, as I knew that others had already done; but they were induced to entertain it principally by my knowledge (obtained from the perusal of minutes of meetings held at Buckingham Palace and Osborne House, and shown to me by Mr. Palmer) of the interest taken by your Royal Highness in the plan, and of the confidence which existed by your Royal Highness in this matter in Messrs. Cole, Fuller, and Russell, from whom (then personally unknown to the contractors) the latter received an assurance of willingness to co-operate in the executive. Your Royal Highness has the guarantee that the proposal will be carried out in such a way as a Royal Commission might direct. The Society of Arts have the honour of being the organ for executing the proposal without any risk or loss to themselves. The public not only have no risk of loss, but will have, in fact, all the profits of the undertaking, because I submit that a fair remuneration for risk and employment of capital cannot be considered as any other than an ordinary charge. In fact, the contractors are the only parties unprotected, and are liable to all the risks whatever.

It was most truly a paramount duty of his Royal Highness and the council to see that the public were protected, and that the sums subscribed should not be jobbed away, or recklessly squandered in favoritism, or useless expenditure; but every guarantee was given in the original agreement, that the public should reap to the fullest extent their share of the amount subscribed; for the two-thirds of the surplus, if any was awarded, with this important proviso, that, before a single pound was appropriated to their own use, they had agreed to pay every additional expense connected with the exhibition, exclusive of the building, and the objects explicitly named in the indentures; and we do think the introduction of this change in the agreement by no means in accordance with that liberal spirit in which the question was entertained by the contractors.

THE FATAL STEAM-BOILER EXPLOSION AT MR. DAKIN'S.—In the Court of Common Pleas a case, arising out of this melancholy accident, came on for hearing yesterday, in which the widow and administratrix of the late Mr. Dakin was plaintiff, and Mr. Brown, of the firm of Munt and Brown, of Wood-street, Cheapside (the patentee of a new steam generator), defendant. Mr. Sergeant Wilkins, Mr. Ogle, and Mr. Needham were counsel for the plaintiff; and Mr. W. H. Watson, Q.C., and Mr. Edwin James for the defendant. The action was brought under Lord Campbell's Act by the widow, Mrs. Dakin, the eminent grocer in St. Paul's Church-yard, to recover compensation in damages for the bereavement and sorrow which had been occasioned her from the bursting of a boiler supplied by defendant for a new plan of roasting coffee, by which Mr. Dakin met his death. In the *Mining Journal* of 20th May, 1849, and other numbers, we gave detailed reports of the accident, and the coroner's inquest, illustrated by diagrams descriptive of the machine, from drawings and practical details by our correspondent, Mr. George Shepherd, C.E., who will, we believe, be examined at the present trial. The case was opened yesterday, and will probably last one or two days more; and, as it is important in a scientific point of view, we shall return to the subject in our next. Among the witnesses examined were Mr. E. J. S. Dixon, manager of the Royal Bangor Slate Quarries, and Mr. Naamth, consulting engineer.

Just as we were going to press, we have been informed that the defendant has declined to proceed with the action, and agreed to pay 800l. damages, and all costs.

THE GALVANIZED IRON COMPANY.—In the Court of Queen's Bench, on Saturday, an action of debt was brought, to recover the sum of 100l., being the amount of certain calls of 2l. per share, which had been made upon Mr. Ogier, as the holder of 50 shares in the Galvanized Iron Company. It appeared that the company had been formed some time since, and carried on up to the year 1848, when it was found necessary to obtain an Act of Parliament to dissolve it, and to wind up its affairs. By this Act, power was given to the directors to make certain calls upon the shareholders, for the purpose of discharging the then existing debts and liabilities, and, under the provisions of the Act, the present call was made upon the defendant, who had previously paid calls to the value of his shares, which were 10l. each. At the conclusion of the plaintiff's case, Mr. Crowder, on the part of the defendant, submitted that the plaintiff had not proved his case, as he was bound to do, upon the transference taken in the defendant's plea. In the first place, he had not proved that the company, described in the declaration existed, or that it was duly registered, the certificate of registration put in evidence not describing the company by its right name; secondly, the calls were not made in the manner prescribed in the statute mentioned in the declaration. Mr. Justice Coleridge said he should decide against the learned counsel, but would give him leave to move the Court again to enter a nonsuit. A verdict was taken for the plaintiff for the amount claimed.

BARLOW'S RAILWAY IMPROVEMENTS.

[Abstract of specification of patent granted to Peter William Barlow, of Blackheath, in the county of Kent, &c., for improvements in parts of the permanent way of railways. Enrolled Dec. 14, 1849.]

This invention, which appears to be one of much importance in railway construction, has reference, firstly, to certain methods of forming the railway chairs, and by its aid, the necessity for the ordinary longitudinal sleepers may be dispensed with; whilst the rails will be secured in their proper positions in a more efficient manner than heretofore. This is to be accomplished by casting two or more chairs in one, and the same piece, with a metal plate, or bearer, which is thus substituted for the ordinary longitudinal sleeper—the railway being formed by fitting the rails to these chairs, placed at intervals, the junction of the rails being effected in the centre chair, in case three chairs be combined with one plate, or bearer. Instead, however, of the chairs and plate, or bearers, being all in one piece, the whole may be longitudinally divided into two pieces, to be secured together by bolts and nuts, transverse sleepers, or bars, passing from one side of the railway to the other.

The invention has reference, secondly, to chairs, intended to be used with the ordinary wooden or other sleepers—the improvement being that, instead of the chairs being cast all in one piece, they are cast in two pieces (longitudinal), and secured together by bolts and nuts.

Having described the invention, the patentee proceeds to state, that he does not confine himself to the precise details shown and described; but claims, firstly, the use of two or more chairs, or parts of chairs, combined with one plate or bearer; and, secondly, the making of ordinary railway chairs in two parts, as described.

Patent-office and Designs Registry, 210, Strand, Dec. 19.

THE MAGNETIC TELEGRAPH IN AMERICA.—The Directors of the Telegraph Company owning the line between Washington, Baltimore, and New York, had a meeting recently, at which, among other resolutions, it appears they are determined to modify considerably the rates of charges on long messages. Up to 500 words the rates remain as they are, which, by reference to a paper by Mr. Whishaw, published in the *Mining Journal* of 29th Sept. last, we find to be four shillings. Messages over 500 words are to be charged on those between 500 and 1000 half regular rates, and for all words above 1000 only one-third regular rates are to be charged. This resolution was to take effect as soon as two additional wires, in course of erection, were finished and working. The whole of four wires were expected to be completed the whole distance within the month of December. The line had been thoroughly repaired, and new posts erected, where necessary, at considerable expense. New plans of insulation had been adopted, and the company were determined to place the line in a condition to give the press and the public every facility for rapid and correct transmission of news. Mr. Bain is said to have made very important improvements in his printing telegraph. He can give to 500 machines, or less, scattered over the Union, a simultaneous movement, so that dots, lines, or other emblems, made at Halifax, may be multiplied at the same moment at New Orleans, Louisville, and all the intermediate stations; 1000 letters are transmitted per minute, and he has succeeded in dispensing with perforated paper. Among the latest improvements connected with the electric telegraph is one by Mr. Green, of New Jersey, for coating electric wires by the combination of rotating and stationary brushes, with a portable receptacle for paint, or other coating matter, arranged so as to produce the desired effect. A Mr. Pratt, of New York, has patented a plan for stretching wires over great distances, such as rivers, &c., by suspending strong gum elastic band, cord, or tube, to the posts, which, by being drawn out in the first instance, always keep, by their elasticity, the copper wire stretched. And Mr. Curtis, of Ohio, has patented an improved mode of constructing indicating telegraphs. He employs a revolving disc, or plate, marked with successive series of numerals—0, 1, 2, 3, 4, &c., in a circle, or otherwise, such plate being revolved by degrees as the galvanic circuit is broken and completed; these numerals represent the letters of the alphabet, and words can be spelled by it with the greatest facility. A company for the manufacture of gutta serena, called the Hudson Company, has been established in Brooklyn; but, from its increasing business, it is to be removed in the spring to Kariton, New Jersey. Among the other various purposes to which it is applied, they have commenced the manufacture of insulated copper wire for telegraphic purposes; and it was expected, in a very short period, that it would completely supersede the use of posts, and that the wires would be laid underground, as recommended here by Mr. Whishaw, and so generally adopted in Prussia. The North American Telegraph Company have some of this coated wire in operation at Fort Lee, in crossing the North River, anchored to the bottom every 30 ft. by iron weights; and in crossing the plains and forests towards the Pacific its advantages are obvious.

ANTIQUEITY OF THE ELECTRIC TELEGRAPH.—Although distant instantaneous communication by electricity is generally considered a modern invention, we have occasionally published extracts from old works, bearing strong evidence that the first crude experiments upon correspondence by this agent are of some antiquity. The following is an extract from a quaint work, published in 1661, by Dr. Joseph Glanville, a native of Plymouth, entitled *The Danger of Deceit*, and as the properties and deflection of the magnetic needle are so well described, it is highly probable they were known in the very earliest years of the seventeenth century. He says, at chap. 21—"Another instance of a supposed impossibility which may not be so. Of conference at distance by impregnated needles. That men should confer at very distant removes, by an extemporary intercourse, is a reputed impossibility; but yet there are some hints in natural operations that give us probability that 'tis feasible, and may be accomplished without unwarrantable assistance from Democritean correspondences. That a couple of needles equally touched by the same magnet, being set in two dials, exactly proportioned to each other, and circumscribed by the letters of the alphabet, may effect this mercurial, hath considerable authorities to avouch it. The manner of it thus represented. Let the friends that would communicate take each a dial, and having appointed a time for their sympathetic conference, let one move his impregnated needle to any letter in the alphabet, and its affected fellow will precisely respond the same. So that I would know what my friend would acquaint me with, 'tis but observing the letters that are pointed at by my needle, and in their order transcribing them from their sympathized index as its motion directs; and I may be assured that my friend describes the same with his, and that the words on my paper are of his inditing. Now, though there will be some fit contrivance in a circumstance of this invention, in that the thus impregnated needles will not move to, but away from, each other (as ingenious Dr. Brown, in his *Pseudocritica Epidemica*, hath observed), yet 'tis but reading counter to the magnetic informer, and noting the letters which is most distant in the Alfabetic circle from that which the needle turns to, and the case is not altered. Now, though this desirable effect possibly may not yet answer the expectation of inquisitive experiment, yet 'tis no despicable item, that by some other such way of magnetic efficiency, it may hereafter with success be attempted, when magical history shall be enlarged by riper inspections; and 'tis not unlikely but that present discoveries might be improved to the performance."

EXPERIMENTS AT NORWICH WITH THE ELECTRIC TELEGRAPH.—On Monday, two scientific and practical workers of telegraphic communication between London and other large cities in England, arrived at the terminus of the Eastern Counties Railway at Norwich, to try various experiments on the wires communicating between that city and the metropolis. They were courteously received by William Newall, Esq., the chief manager of traffic at that station, and allowed the use of an office quite apart from that required by the clerks for the daily communication to and from Norwich. The foreman of those works was also ordered to attend, who brought two of the wires from the main into that office. The apparatus consists of three distinct mechanical instruments, of a very complicated and delicate make—the first, or chief, about the size of the face of a common house clock, of a circular form, having thereon in front at the top the various letters of the alphabet, forming the upper part of the face, rather more than half round, the lower part having figures; a needle at about an angle of 20 degrees from where the hand works are fixed in the middle, is moved by another delicate instrument to the different letters or figures required to form each word, as the rapid communication progresses. Near to each letter or figure appear perforated holes, by and through which, by certain movements, words within are made to impress, on long slips of paper, in plain legible reading, the sentences as they are given—the same being forced out of this off a roller, and taken ready written for the assistant communicator to make up and arrange as they appear, the whole being worked from a battery of less than half the size, and more simply made than those now in use. By this ingenious process (although yet in its infancy, and consequently in a very imperfect state) more than sixty letters were struck off in a minute, plain and distinct to any eye; and such communication, at that rate, may be transmitted at a distance of 120 miles from that miniature battery for almost an indefinite time. The experiments appeared to create great interest among those permitted to witness their operation. Some were of opinion it was a great improvement over the "needle" transmission, others thought differently—as it was stated by those now connected with the Norwich telegraph, that they have transmitted from their office 125 letters per minute, and at that rate over a space of a full column, to different working daily papers, particularly when the trial of Rush was on in that city. In answer to this, the new experimentalists assured those present, that as soon as their invention was fixed and ready to work without interruption, at least 200 letters per minute might be worked off, and at for immediate transmission without first copying, keeping the communication a secret to all but those for whom such was intended.—*Globe*, Dec. 19.

Original Correspondence.

ON THE EXTRACTION OF GOLD AT FLINT.

Sir,—Much has been said of late respecting "gold regions," "new discoveries," and "California," with wonderful accounts of the "diggings" there and in other parts, and occasional subtle calculations as to the eventual effects of such unprecedented, though as yet chiefly anticipatory, influx of the precious metal. In fact, the writer, from his own experience of the distaste created by the continual notices of what now has become a hackneyed subject, fears the bare announcement of something new and improbable, relating to gold, is almost sufficient to cause the readers of your valuable *Journal* to turn to another part, almost in disgust. However, what I am about to state is not altogether uninteresting, being based on facts; and the operations being actually carried on with a view to exhibit a new and important source of mineral wealth in Wales—a portion of the United Kingdom long and deservedly noted for its underground produce, and the persevering search of its generally poor but indefatigable inhabitants.

In this immediate vicinity, sundry mining and smelting operations are, and have been for a great length of time, prosecuted with much spirit and no ordinary skill, whilst considerable sums have been expended—thus giving employment to a large and industrious population. I may instance the lead smelting-works in Bagillt, conducted by Messrs. Walker, Parker, and Co. (these are much the largest), those of J. Mather and Co., who were instrumental in first developing the merits of Mr. Pattinson's patent for desilvering lead, which they purchased, and likewise Newton, Keates, and Co., who also manufacture copper and shot at Greenfield, where the processes are, I am happy to say, in a flourishing state. These several parties reduce immense quantities of lead and silver ores, extracting silver to a large amount, and each make sheet lead; and, in my humble opinion, the prices given for the ore, and mode of payment, offers every inducement to enterprise; and, though some may think different, I have good reasons to believe it is alike consonant with their interest and inclination to encourage the miner.

At a future period I may enter into some details of a plan I patented, and which was adopted by Messrs. Walker, Parker, and Co., to condense the immense volumes of metallic fumes emitted from their works, in which they have succeeded, though, unfortunately, at a greater expense than was anticipated, owing, in a great measure, to unforeseen circumstances. The attempt, however, is creditable, and any one who may see its complete and gigantic scale cannot help admiring the same.

Owing to the expiration of the desilvering patent, I am happy to observe the compact works of Mr. J. P. Eytton (the only Welsh smelter in these parts) are being enlarged and improved, and the day is not far distant, I trust, when he will have the new process for extracting silver (which I was employed to erect in combination with some mechanical arrangements I invented), and his complete manufactory for making sheet-lead and pipes, in full and active operation.

Besides the above, there have been cotton manufactories, and more recently zinc-works, but these have been abandoned by Mr. Crookford *pro tem.* also extensive copper works on the celebrated Holywell stream have, unfortunately for this town, been given up, and the processes, instead of being carried on here, are conducted at Swansea.

We yet can boast of paper-works and flourishing collieries, foundries and alkali-works. The only remaining works I shall allude to are those at Flint, most elegantly situated, and belonging to Messrs. Roskell and Co., and where the late and esteemed proprietor carried on smelting with due spirit, till he was unable to compete with "the trade," owing to not having the benefit of the patent for desilvering lead. Since these processes ceased, the manufacture of alkali was carried on till recently. After standing some time, which was a great loss to the neighbourhood, and increased by the decease of Mr. G. Roskell, sen., the said works were again seen to be in partial use. The anything but handsome dome, or chimney, has of late given forth a vapour or smoke—signs that better times are coming.

And now I come to the wonder announced at the head of this article—the extraction of gold; for which purpose, in connection with other metallurgical processes, these long-neglected works have been taken by a party eminently qualified, as I have been informed, as regards scientific knowledge, for carrying out so difficult and novel a project. I do not venture to announce that gold has been got from some debris, or wastes, brought from the neighbourhood of Dolgelly, and I do not remember the true, but homely, saying of the Scotch bard—"Facts are chiefs that winna din, and canna be disputed." I have not seen the processes—being unfortunately prevented accompanying a friend who has many tastes, in common with the writer, and who was invited to see the *modus operandi*; the result of which was he felt much gratified at what he witnessed. On estimating the probable cost and expected yield, he was anxious to enter into the undertaking, in which, on his representation of what he saw and heard, he was cordially joined by many respectable and intelligent parties; and had not the present proprietors of the works determined to engage themselves, little doubt exists that a strong joint-stock company would speedily have been formed.

I may here name the process is patented by the parties who, for some months, have been experimenting on a large scale, and who require increased capital to fully carry out the plans. I do not offer any opinion as to the eventual result; it is to be hoped it will answer every and the most sanguine expectations entertained. All, however, is not gold that glitters; neither does it follow that, when gold is obtained (and this certainly has been done at Flint, and I saw a beautiful specimen extracted from 5 ozs. of the stone, or stuff, by my scientific friend, Mr. Roberts, surgeon, the gentleman already alluded to), it is such a profitable process as some may think at the first flush.

As far as I understand, the ore or stone can be got in large quantities, and the owner of the mine or heaps got gold by mere crushing and washing to the amount of about 4000 some years ago, but it proved unremunerative. Mr. Wilson and partner (the patentees) treat the mineral in a different way at Flint, obtaining, besides on an average 3 ozs. of gold per ton, sulphate of copper and zinc, and a portion of silver. Time alone will show if this is done at such a rate as to leave a profit, and I hope to see the day when an ingot of gold sent from the said works will be a matter of as little surprise as the many and heavy cakes of silver dispatched weekly by the lead smelters. This being the first notice of a new feature in our Flintshire operations, I trust you may deem it worth insertion.

Bryntirion, Helywell, Dec. 13. J. D. STACE.

MINING IN IRELAND—BANTRY SILVER-LEAD MINE.

Sir,—Judging from your excellent and widely-circulated *Journal*, mining appears to have taken a favourable turn in almost every quarter—may we not, therefore, hope that it will also take a turn for the better in this country, and that capitalists may be induced to speculate in Ireland as well as in other parts? It has been proved beyond a doubt that there does exist in this country vast mineral wealth; some, indeed, say the country generally abounds in mineral, but that the lodes do not make in depth—who can prove that they do not? If we may be allowed to judge from the Berehaven, Knockmahon, the Wicklow and Wexford Mines, the most sceptical must be convinced that those have made in depth. All that is wanted to make this a great mining country are capitalists and English agents, to conduct the operations of the mines; without which nothing will ever prosper here in the way of mining. Several attempts have been made, at mining in the south-west part of this county by Irish companies, and, though conducted by experienced Cornish agents, have, with only two or three exceptions, been abandoned—not from poverty, or bad management on the part of the agents, but merely from the country being composed of "Irishmen," who, by the time the mines were got into good working order, were sure to come to loggerheads, each fighting for power and place; and no matter how promising the mine, her fate was sealed from that time. It is, however, exhilarating to find there is one concern now in full working order, held by Englishmen, and conducted by Cornish agents; there is every prospect, judging from present appearances of the mine, of its proving a valuable and remunerative one to the shareholders. I allude to the "Bantry Silver-lead Mine," which was commenced in July last, and there is already about 20 tons of good silver-lead, raised and dressed; from a sample, which was analysed by Mr. Mitchell, of London, it was found to yield 77 per cent. of lead, and 30 ozs. of silver to the ton (of 20 cwt.). There is a shaft now sinking on the course of the lode, worth 20s. per ft., and a shallow adit level, driving east, is worth 10s. per ft. The company are obliged to confine their operations for the present to mere costeaning, consequently inexpensive workings, the late rains having flooded the whole country; but no doubt the approaching summer will prove her aid in the matter.

Bantry Bay, Dec. 19. J. D. STACE.

MINING INVESTMENT—HOME AND FOREIGN.

Sir,—At the present time, when the public attention is so much, and so properly, taken up with the employment of the working classes, I beg to send you a few remarks upon the subject, with reference to mining, if you think them worthy of insertion in your useful publication. It is apprehended that, for some time at least, the effect of the repeal of the Corn Laws will be to throw many hands out of work, and thus to swell the already great numbers of the unemployed, to the unavoidable increase of the poor's-rates, and the overcrowding of the union workhouses. The great increase of population, as marked by the census of 1841, over the previous 10 years, in England, has made many timid persons afraid that the produce of the land would not suffice for their subsistence—as if the providence of the Almighty was not sufficient for all things. There can be no doubt in the mind of any right thinking man, but that Providence would supply the means of sustenance to all the creatures that he is pleased to place upon the earth. If, therefore, there is any deficiency of supply, the error must be with man, and not with God.

There are, at the present time, many hundred thousand acres of land uncultivated in England, that would not only employ, but feed thousands of the people who might be occupied in reclaiming and cultivating them. The same remark applies to many of our colonies—Canada in particular. But it is not only in an agricultural point of view that so many of our great population might be advantageously employed. The soil of England abounds with riches beneath, as well as upon the surface. The advantage of the coal trade has been well dilated upon at the recent opening of the new Coal Exchange. Various parts of both England and Wales abound in tin, copper, and lead mines, which are only partially developed, Devon and Cornwall in particular, many mines of which make a good return for money invested in them; while the increasing population, and the vast demands occasioned by the improvement in the arts and sciences, call yearly for greater supplies of those metals. There are at present two great desiderata in England—emigration, on a large scale, for the superabundant population, and employment for the able-bodied workman remaining. The colonies, as has already been observed, would provide sufficient space and occupation for such as would emigrate, while the mines at home would give abundant employment for the others.

Owing to the great reduction of the interest of money, gradually taking place these last twenty years, capitalists have been searching out every quarter of the globe for some speculation or other, wherein to employ their idle capital to greater advantage than they could do at home. Though we pride ourselves, as a nation, at having made great and honourable sacrifices, and having spent literally millions of money to put down the slave trade, yet that odious and detestable traffic still continues, accompanied with greater horrors than ever, during the middle passage; and yet, with a singular inconsistency, we give it great encouragement, by the importation of slave-grown sugar, and by the large sums invested in foreign mines, which are worked by slaves in the Brazils. An antidote, however, in a degree, luckily grows beside the poison; some of those adventurers who invest their capital in foreign mines are sometimes "let into a secret," and lose a good deal of money, either by the intervention of the native Government, or by the difficulties and extravagant expenses necessarily attendant upon conducting an undertaking so far from home, in addition to the heavy amount absorbed by the office in London, for salaries to directors, &c., the majority of whom are too frequently unacquainted with the details of the subject, which they intrust to the management of one individual, whose means of living depend solely upon his situation, and who, with the chief captain abroad (in some instances with a salary of more than 1000*l.* a-year), having a personal interest in continuing the operations, might be induced to do so, after the riches of the mine had been exhausted, and every reasonable chance of further success had failed.

This objection would not apply to our own mines, conducted upon the Cost-book System, where large sums could be employed, giving a sure return for the money laid out, and giving employment the while to thousands of our own countrymen, who are at this moment in distress, because they cannot find work.

One excellent gentleman near Fowey now employs several hundred persons in his mines; and the esteem in which he is held, not only in the neighbourhood in which he does so much good, but throughout the county, would, of itself, be no small reward, to say nothing of the considerable returns arising from his large and well conducted operations.

And in the instance of the Devon Colliery, which it has provided the means of subsistence to about 1000 labourers, has, at the same time, substantially rewarded the fortunate adventurers, by returning to them, in the shape of dividends, 7000 per cent. on the outlay, the very first year of working the mine; and each succeeding year, up to the present time, has continued to develop still greater riches than the previous year—thus proving the speculation to be a prize to the original shareholders, far surpassing in value the great prizes in the lotteries of former years.

But it is not only in the far distant countries, such as Mexico, Brazil, and other portions of South America, that adventurers peril their money, the same thing takes place in Europe; let any one read the account of the proceedings of the Asturian Mining Company, and I think it will cure him of the maniacal hope of building a "chateau en Espagne."

No! let the money be kept at home, and employed at home, and that will be doing good to both parties, employers and employed.

Nov. 12. 1849. CANDIDUS.

COLLIERY RAILWAYS.

Sir,—The origin of railways is generally attributed to a "Master Beaumont, a gentleman of great ingenuity and rare parts, who adventured into the mines (in the neighbourhood of Newcastle), with his 30,000*l.* &c.; and who, "within a few years, consumed all his money, and rode home on his light horse." As the work, *Gray's Chorographia*, from which this brief extract is taken was published in 1649, upwards of two centuries have elapsed since railways, or "waggon-ways," superseded common roads, as an improved means of conveyance for mineral produce. The railway constructed by "Master Beaumont" was, doubtless, a very crude and imperfect development of this valuable invention; yet the general adoption of this system by the colliery-owners of that, and other districts, proves it must have been more economical, and, in other respects, superior to turnpike, or other roads. Notwithstanding the advantages which resulted from adoption of these waggon-ways, we are unable to discover that any material improvement in their construction had taken place for at least a century after Master Beaumont had ridden home on a light horse. In 1745 they are described as constructed of oak, or beech rails, laid upon timber sleepers, on the surface of the ground, and undulating with the country. Shortly after this period plates of malleable iron were nailed on top of the wooden rails, and in 1767 cast-iron rails were resorted to, by the Coalbrook Dale Iron Company. Gravity was first employed as a motive-power in 1797 by Mr. Barnes, who made a self-acting inclined plane, in connection with the Benwell Colliery, near Newcastle. It was not until 1805 that the stationary steam-engine was used on railways, when it was employed as a motive-power by Mr. Curr, on the Black Fell waggon-way. The honour of having introduced a locomotive engine on railways belongs to Mr. Trevithick, whose first engine was made in 1804, and tried on the Merthyr Tydfil Railway on the 21st February of that year. It drew after it, at the speed of five miles an hour, 10 tons of iron and 70 persons for nine miles. The practicability of employing locomotive engines having thus been demonstrated, the attention of engineers was directed to the subject; and various improvements and modifications of the machine were made by Messrs. Blenkinsop, Chapman, Brunton, Hedley, Stephenson, and others. The employment of steam-power induced improvements in the construction of railways, and the surfaces were made in a series of planes by excavations and embankments, and the partial substitution of malleable for cast-iron rails, also took place about this period. From this brief historical sketch, it will be observed that the discovery of all the principal means and appliances for railway transit, as well as the origin of the system itself, is to be ascribed to the necessity which impelled the cheap production of coal. Yet with the knowledge of all the requisites for facilitating the economical carriage of the produce of our mines to the markets, the improvements on previous discoveries were few and unimportant, and the whole system was carried on in an imperfect and crude manner, both as regards the design and construction of the railways, nor was that attention paid to the maintenance of the railways and machinery, which is so essential to the full efficiency and beneficial results of this mode of transport.

The opening of the Stockton and Darlington Railway in 1825, and of the Liverpool and Manchester in 1826, was the commencement of a new era in railway affairs. As a means of internal communication for both passengers and merchandise, the safety of the travellers on them, and the high speeds which are obtained, it became necessary to pay a zealous at-

attention to the minute, as well as the large works; and, in consequence, many very important improvements have been made in their construction. Comparatively few new inventions have been generally adopted, but the great and manifold improvements which have been made on the original wagon-way and its appliances, is almost as great an advance on colliery railways as they were on the common roads in the time of Master Beaumont. Neath, Dec. 18. J. RICHARDSON, C.E.

A MINER'S OPINION OF SAFETY FUSE.

Sir,—From the spurious quality of fuse supplied to this locality at different times, I believe the results have had, unfortunately, a most prejudicial effect against its more general adoption. The following is a dialogue I had with a sinker, the other day, who was driving some rock work:—"How should you like some safety fuse if I got it for you, instead of your straws?" "Why, I wouldn't use it if you was to buy it." "Why?" "I'll tell you why, and I know you'll say my reason is enough. When I was sinking pits, and had got down about 150 yards, there was a good deal of water, and nothing must do but some of this fuse, and one of the holes that was charged we fired; we came up the shaft, and sat in the hovel 17 minutes, waiting to hear it go; but we at last made up our minds it was a miss. We went down the shaft three of us, and began to prepare to draw the fuse, and fill the water out of the bottom of the shaft, when on a sudden something was heard to fiz in the hole, and by the time we could scramble into the barrel (and God only knows how we did get in), and drawn up within about 6 yards of the top, it fired; and I then promised my poor quaking limbs they should never be hung over another piece of fuse that had missed in a pit bottom. I've been a fore the magistrates at twice this last summer (continued he), for stealing straws out of —'s premises, and I'll go a fore them again a fore I'll have any fuse. I should think it was 25 minutes from the time we fired the fuse till it blowed."

The above is one of a great many such instances in this district; and the vending of a spurious article has been the sole cause of producing a dislike and fear to its adoption; and nothing but the supply of a genuine article will be the means of restoring confidence. I do not myself know of a more hazardous task than to approach a charge on a miss taking place. I would recommend the Cornish manufacturers to devote their time to the study of securing a continuity of the fuse, instead of cavilling about the extent of their connections; and for the future take care that a better article finds its way into—STAFFORDSHIRE: Dec. 16.

WATER-PRESSURE ENGINE.

Sir,—The answer to the question by a "Constant Reader," in your Journal of last week, with regard to a water-pressure engine, is as follows: The amount of power lost by friction in these engines is about 25 per cent., but varying somewhat according to the size and height of the lift of pumps. They will work from four to six strokes per minute, and, of course, must consume 25 per cent. more water than they lift to an equal height to their own column; in the case in point, the column being only one-fourth the height the water has to be lifted, the quantity consumed must be four times the quantity raised, and 25 per cent. additional, or 6875 lbs., or 687 gallons, or 111 cubic feet in a minute. To do the work required, the pressure engine must be, at the least, 18 inches in the cylinder, with a 6-foot stroke (20 inches would be better), and this, working five strokes per minute, will do the work required. A plunger-pole of one foot diameter should be attached to the engine, and the column of the plunger must be 8 inches diameter. The plunger, travelling 30 feet per minute, will discharge 1470 lbs. a minute, or rather more than the quantity required. In case a "Constant Reader" requires a water-pressure engine, I have a new one, not having occasion to put it up, after having it made, which I will dispose of at half the cost price; it is fully equal to the work he requires to be done. HENRY CROCKFORD.

See Cottage, Queen's Ferry, Flintshire, Dec. 18.

MINES AND MINERS OF CORNWALL.

Sir,—Seeing in the *Mining Journal*, and the *West Briton*, an article, copied from the *Morning Chronicle*, relative to the mines and miners of Cornwall, I beg to make a few remarks. There is a club in every mine of any magnitude—the labourers in which pay 6d. per month, not weekly, as stated; and also 6d. per man per month to a surgeon, for which the men only are attended. In case of accident in the mine, rendering the man incapable of working, he gets from the club 1s. per day; and if he should die, in consequence of such accident, his wife or friends receive from the club 10l., and the funeral expenses are defrayed by the shareholders of the mine where the accident occurs. The mines vary as to the deductions for tramming, wheeling, barter, &c. An active good labourer gets, on an average, 12s. per week on tutwork, and 14s. to 16s. per week on tribute; but some, for want of proper activity and skill, do not get 10s. per week. But for this mode of contract work, mines could not be carried on to advantage; if paid by the day or week, not half the labour would be done, as the captain cannot be always with them. Our men prefer contract work, as they then get paid in proportion to the labour done. Saints' days are very general in Cornwall, but the men are only allowed the Sunday and Monday, on which days they feast a little; but I am not aware to the extent mentioned by your correspondent. WILLIAM RICHARDS.

Redruth, Dec. 14.

OPEN SHAFTS AND THE TRUCK SYSTEM.

Sir,—I was pleased to read your remarks upon old and disused shafts being left open in the coal districts. I trust it may form an important subject in the forthcoming report of our Government inspector and countryman, Mr. Blackwell; for, I would venture to say, no man in this district knows more of the dangers of old and open shafts than he does, for the concern in which he was at one time interested was the cause of more accidents of this nature than any half-dozen concerns put together in the district, some of which, indeed, have often formed the subject of severe animadversion from you in recording accidents of this nature. I would recommend that, instead of fencing round, as you observe, cast-iron plates should be put over them, which makes an excellent cover. In the more wealthy and respectable concerns in this district cast-iron plates are sometimes adopted; they are cast in two semicircular halves, with a flange down the middle, and when over the shaft the two halves are bolted together, and require a great strength to displace them in the least, and are always removable at pleasure, and with little expense, and always worth their first cost, or nearly so. Some time ago I had a lot of these plates put over some old shafts, and covered with about 3 ft. of soil, and the land is now made tillable over the spot—the exact locality and position being first measured, from some natural object near, and the distance recorded upon the plan, so that their number and situation can be traced, even when I am no more. Cast-iron plates are not only preferable on account of their stability, but they form a good seal to the shaft, keep the cars and other timber-work from rapid decay, and exclude the air from the workings; and should the shaft at any time give way the plate will sink with it, as it cannot go down the shaft, being much larger.

The lamentable accident you recorded in your last at Wednesbury ought to be sufficient to create a little sympathy amongst our coalmasters, and bestir them to a sense of their duty. The "crowning in," so called, assumed the shape of a flat cone, the hole at the top in the foot-path not being more than 3 ft. 6 in. by 3 ft., but which, alas! proved large enough to swallow up parents and child.

The nefarious practice of trucking the workmen at the large concerns in this district is making a great inroad on the rights of the miner and shopkeeper, and ought to form an important subject for our inspector to note upon; indeed, it deserves the immediate attention of Mr. Trevelyan, or some other Government official, as between short work and truck some poor, though willing to be industrious, families are literally starving. Some of the most affluent iron smelting and manufacturing concerns are paying the wages on one counter, and selling trucked goods on the other, under the same roof. I would ask, what is this but truck? Indeed, I saw, within these few days, a 10s. truck ticket sold by a man for 7s., for the purpose of obtaining the cash to go elsewhere, or to buy other things that were more necessary for their comfort.

I observe a meeting was held last week at Walsall, with a view of preventing as much as possible this abominable practice, and resolved to establish a society, to be called the "Walsall Truck Preventive Society, for the Protection of the Fair Trader and Working Man." A committee was formed, and a subscription entered into, to defray the expenses incurred, and I sincerely trust the worthy committee will lose no time in making an inroad into the abominable practice.

But when the doings of some of our iron lords are well considered, it is no wonder that the result is what it is; for when any minerals are in the market, reckless competition ensues, and exorbitant prices are given for a

lease of the minerals—prices that they know at the time cannot pay without "putting the screw on." Truck and the batty system becomes the rule of the day, and withal, some fine morning, you find this worthy gasseted for 100,000l. or more, and probably not a farthing dividend after the lawyers are paid; a suspension of the works for three or four months, and the consequent half-starving of a population of some 3000 or 4000 of the adjacent population. I trust our representative, as Government inspector, may give these subjects his close attention; but not having seen, or scarcely heard of, his visiting the South Staffordshire field as yet, whether they will be ready by February or not is a question, I think. I fear that when February comes "more time" will be the cry, and so the mining public will be held in suspense for some time longer, which would otherwise have been prevented by the appointment of a greater number of inspectors; yet should the worst of our fears be realised, I trust the value of their several documents will compensate for the delay sustained. Dudley, Dec. 18. A FRIEND TO THE HONEST COLLIER.

ON THE MANUFACTURE OF IRON RAILS.

Sir,—Mr. R. P. Davis, in your last Journal, instead of accounting for the deterioration of railway bars, passes over the whole matter, as though he had never seen or heard of such a thing, and begins to fight a battle between Welsh and Staffordshire iron. Now, there is no foundation for this in any letter that has appeared upon the subject, nor anywhere else, except in Mr. Davis's own imagination: such a course is neither manly or creditable in any contest. He next reiterates some recent trial by Mr. Dockray on the London and North-Western line, without giving any particulars. Why, the very fact that that company having just purchased about 20,000 tons of English rails, at a higher price than Welsh rails are selling at, is the best contradiction that can be given to that statement. He then shows that my rails are offered at 2l. and 5l. per ton above Welsh rails; he might have shown this arose from one kind of my rails being made from a quality of iron now selling in bars at 7l. per ton, while his are made from a quality of iron now selling in bars at 5l. per ton. The charcoal bar is made from part charcoal iron, worth in bars just what it is charged in the rail; therefore the purchasers have value received, just as much, if not more, than in Mr. Davis's case. But these rails are in wear at a place where I have seen Welsh rails go all to pieces, and obliged to be taken up in three months, and have stood the test now going on from between two and three years, and in the bulk are nearly as good as they were the day they were put down; Mr. Davis knows where to see them, if he wants proof of my statement.

It is not against Welshmen or Englishmen I have anything to say; but against a system which is proving itself injurious and discreditable to all parties concerned. I defy Mr. Davis, or any other ironmaster, to produce me a calculation of the cost of making railway bars of the best material and manufacture, as they used to be, at anything near the price at which they are now selling; without serious loss; and I cannot help expressing my surprise at his stepping forward as the advocate for perpetuating such a system. Would he not be better employed in advocating a fair day's wage for a fair day's work; a good fair price for a good fair quality—the principle of live and let live? He would then be doing an act of justice to the shareholders in railways, as well as promoting the interest of the shareholders in the Rhymney and other joint-stock companies, whose property is now wasting away like butter in the sun. There are two classes of her Majesty's subjects that I feel very sorry for, because I know they are travelling fast on the road to ruin; first, the ironmaster, who is making railway bars of real best No. 3 iron, and selling them at 5l. per ton; second, the British farmer, who is producing English wheat, and obliged to sell it at 5s. per bushel. In the former case, a little relief can be got by adulteration in the quality of the metal used; but in the latter case, adulteration is not to be accomplished; and, therefore, if things remain in this state, his days are numbered, and are of very short duration. If my old friend, Mr. Davis, should put another mark to be shot at in your Journal, I hope he will take care and let it be worth powder, or I shall not pull the trigger again. G. B. THORNTON.

Waterhampton, Dec. 20.

P.S.—I would just observe, I have been remanufacturing some hundreds of tons of old rails, both of Welsh and Staffordshire make; and, instead of finding the Welsh rails to be strong red-short iron, in the true meaning of that term, I have found them to be of weak rotten-short iron, and when worked over and over again, it would not make best No. 3 bar-iron. I found some Staffordshire equally bad. It won't do, friend Davis: you will not catch old birds with chaff.

CHEMICAL STRUCTURE OF IRON, &c.

Sir,—The terrific volley of Latino Hellenic derivatives launched against the devoted heads of Messrs. D. Mushet and Mitchell by Mr. Radley forcibly reminds me of the memorable controversy between Moses and Squire Thornhill. Strip, however, of its superfluous garnish of polysyllabic *ou-rotundo-ism*, there yet remains much that is ingenious and instructive in Mr. Radley's communication. I imagine that Mr. D. Mushet will find it as difficult a task to reply to Mr. Radley's present remarks as formerly, when the latter gentleman called upon him to explain how the simple heating of the air could, in a blowing-engine, increase the power of that engine, so as to enable it to sustain a column of blast at a pressure of 3 lbs. per square inch, whereas with cold air it could only maintain one of 2 lbs. per square inch. But it is the fashion for scientific gentlemen not to notice any little objections which may awkwardly be raised to invalidate their position. Well may Mr. Radley be amused at the lucubrations to which he alludes, for we are told by Mr. Leighton that the very evil which debases and depreciates our merchant bar-iron is the means of adapting this bar-iron to common uses. It makes it weld; it makes it soft, and easily workable; it makes it pliable, and readily moulded to the purposes of the smith; and when this vital principle, this *carbo-oxide*, is quite squeezed out, as with boiler-plate or tin-plate, then, behold, the common smith cannot work it! What a boon would a few tons of tap-slag, the *ter-silicate* of iron of Mr. Radley, prove to the Swedish forgers, even without roasting it into bi-silicate, or true silicate of iron. But Mr. Mitchell denies the existence of this metallic glue in bar-iron, though it has been proved to exist to the extent of several per cent. in English bar-iron by the master of iron, the late David Mushet. Mr. Mitchell is going to analyse some bar-iron, to set this point at rest. What bar-iron; and how prepared for analysis? Is it to be a piece of best Staffordshire nail rod, or a cut off the worst kind of Welsh mill bars? And how can this analysis show whether the *carbo-oxide*, if any, was taken up in the puddling-furnace, or passed into that furnace as a constituent of the pig or refined iron of the charge? We are told by Mr. Leighton that pig-iron is passed into the refinery, that it may absorb carbon and oxygen. Refined iron, then, contains more carbon than grey pig-iron. This is likewise the doctrine of Mr. Mitchell, as formerly advanced in the *Mining Journal*, but now more recently contradicted (*vide* Paper No. 36) by his analysis, showing that it contains less carbon than grey iron. Then, again, in Paper No. 37, we are left in doubt whether Mr. Mitchell means white iron, or high-blown metal, as retaining its soft pasty state longer than grey iron; or rather, we are left to doubt whether Mr. Mitchell is aware of the marked and characteristic difference between white pig-iron and refined metal. We hear of slags, and other substances, which give up their oxygen readily; we even hear of lumps of iron (*mosel iron*) revived from slags in an air-furnace; after this the *carbo-oxide* theory becomes plain and simple.

Mr. D. Mushet tells us that charcoal bars, or hammered iron, are destitute of fibre, and Mr. Leighton adds that pure iron will not weld. What strange opinions are these? There is, perhaps, no kind of iron which exhibits so fine an assemblage of fibres as the Russian oil sable, under certain conditions. Take a piece of old sable iron, and draw it into a rod; allow the rod to cool down to a temperature of about 600°, and then plunge it into cold water; the fracture will appear one mass of distinct and well-defined fibre. Reheat the rod, and then hammer it till cold; all traces of fibre will have disappeared; but by simply reheating, and again immersing the rod at the temperature of 600°, the fibre again appears. If a fibrous bar be, as it is termed, "upset," until its length becomes its breadth, still the fibres will be seen as regular and well-defined as before. All bar-iron of the fibrous kind shows, in a more or less marked degree, these alterations from the fibrous to the crystalline arrangement, and *vice versa*, under similar circumstances, indicating that fibre is merely an electro-chemical condition of bar-iron, which may be instantaneously destroyed, and reproduced, by apparently simple causes. We cannot fail to be struck by the close resemblance between the fibre of bar-iron, and the fibrous arrangement which iron filings will assume when acted upon by a magnet; and the fibre of bar-iron is always in the direction of the length of the bar, and not in that of its breadth—that is, it is always in the direction of the magnetic currents which pass and re-pass along the bar. To attribute the existence of fibre in iron to the presence of tap-slag is absurd. We might as well attribute the existence of the fibre in wood to the pre-

sence of the sap. In fact, a bar of iron would resemble a bar of wood which can only be split in the direction of its fibres, and must be used with strict attention to that arrangement; whereas fibrous bar-iron may be beaten endways until its length becomes its breadth, and still remain as fibrous as before, and as fit for any purpose. That cinder has any effect towards inducing the welding of iron, or steel, is equally absurd. That it may, and actually does hinder this operation, is pretty certain, and that by interposing between the surfaces intended to be united a film of vitreous matter, not sufficiently fluid to be expelled at the first light blow of the hammer. To obviate this difficulty the common smith adds sand, to create a more fluid slag, and thus to enable the heated surfaces to come more readily into contact. In what Mr. Radley calls the abnormal welding of cast-steel, borax is used; and this, from the excessive fluidity which it communicates at a low temperature to all kinds of slag, occasions the vitreous film to become so liquid, that the slightest blow expels it, and brings the surfaces of steel into close contact. This, however, is not a true welding, for the pieces will again separate, if hammered and drawn out together. The true welding of cast-steel can only be effected when the steel is very soft, and, therefore, slightly carbonized, so that its fusing point is far removed from that of the welding temperature, or when a harder quality of cast-steel is rendered artificially as difficultly fusible as ordinarily soft steel. When the range of temperature from the welding to the fusing point is very limited, the steel, as it approaches the welding heat, loses its coherence, and crumbles to pieces. This range is far more limited with cast-steel than with the blistered welding steel from which it is prepared, although the cast-steel contains usually less carbon than the blistered steel; but upon restoring to the resulting cast-steel those conditions in which it had existed as blistered steel, it is found to weld with even greater facility than the latter. The impurity in common bar-iron I take to be nothing more than a refractory combination of oxidized bases, such as silica, lime, and clay, in such proportions, that they are not sufficiently fusible to be expelled as slag during hammering, or rolling, or otherwise an actual alloy of some of these bases with the iron. Very probably both combinations exist simultaneously.

I look upon tap-slag as a mixture of silicate of protoxide of iron, with various other matters, as clay or lime, when the latter is used as a decarburizer. The roasting of this slag peroxidizes the iron, and when silica and peroxide of iron only are present, the compound is scarcely fusible at any heat which our furnaces can produce, and when carbon is present yields silicuret of iron, the oxygen of the iron and silica passing off by combination with the carbon. To class tap-slag as a definite compound is out of the question, for its constituents must vary indefinitely. Mr. Mitchell says, it contains silica 20 per cent., and the remainder oxide of iron, phosphoric acid, &c. I have obtained from tap-slag assay buttons of grey iron, ranging from 26 up to 78 per cent. of cast-iron from the slag, or deducting 3 per cent. for carbon, from 23 to 75 per cent. of pure iron. As to Mr. Leighton's enormous per centage, I have never met with it, nor can I satisfactorily account for such a produce as 75 per cent., except on the supposition that tap-slag involves an oxide of iron, containing less oxygen than those which are at present recognised by chemists.

The *carbo-oxide* theory, and that of the treacle toffee evidence, that the art of iron making is amongst even practical men quite in its infancy, and whilst this is the case little can be expected from the praiseworthy, but misdirected, exertions of literary and scientific writers upon the subject, who would find in practice their ingenious theories defeated, and overturned by unlooked-for combinations of matter, so complex and involved, that the ablest mind would fail to comprehend, or to unravel, the apparently contradictory results obtained.

Can any of your correspondents elucidate the phrase, "crystalline charcoal iron," which we are told, in an advertisement extraordinary, forms a portion of the "patent anti-laminating charcoal rail." Though made from my namesake, I am at a loss to divine what may be the significance of the above remarkable phrase as applied to the iron. The plain English of the matter is this, that rails and wheel tires partially made from the splendid Indian charcoal iron will stand 10 times the wear that those made from British *carbo-oxide* iron can endure. The sooner railway companies can view the matter in this light the better for them; for had they to lay their lines with charcoal bars at 20l. per ton, they would in the end effect a saving of cent. per cent. upon the present system. Wootz.

Dec. 18.

CARBON AND IRON.

Sir,—In the *Mining Journal* of the 8th inst. a little mistake has arisen in one of the words of a letter of mine, making it "inadvertent," instead of "inadvertence," which may puzzle some of your readers to make out my meaning. It has arisen, no doubt, from my careless writing; the fact being I sent off merely some loose memoranda, which I intended to have copied, together with some of the following remarks, when a particular engagement called me away.

I am obliged to Mr. Radley for illustrating the formation of fibres so sweetly, and beg to thank Mr. Mitchell for the information contained in his letter. I do not dispute the existence of silicate of iron, but I contend that good bar-iron is a mixture of fibres of pure metal and a compound containing carbon, and that it is the intimate admixture of these which imparts to the iron its good working qualities, and diffuses the property of welding throughout. Chemists have still much to learn, and they should not be too closely wedded to the commonly received dogmas and axioms. Some little time since, I had been keeping up a strong fire of anthracite culm, with a good deal of pyrites in it, upon one of Kymer and Leighton's water grates, for several days. At the conclusion, I cleared out the fire, to show some parties that no injury had been done to the bars, and from the remains of the fire I picked out some lumps of pure iron, the remnant of decomposed pyrites. I met a young gentleman, a very clever chemist—a chemist by profession—and mentioned the finding of iron as above; he said, very peremptorily, it could not be iron, but merely a protosulphuret; if I had a piece he could soon test it. I pulled a good-sized lump out of my pocket, which he said was too much; he would take part of it, and tried to break it with a poker, but it would not break, instead of which there were the marks of the poker indented in pure iron, which he was compelled to admit. He said it was most extraordinary, and could assure me that no chemist in the United Kingdom would believe it. I then mentioned to him the formation of ammonia by the use of the same grate. He was at first not at all disposed to believe this; but when I explained the circumstances, what I had noticed and carefully watched, with the rationale I had formed to myself, he was more inclined to give me credit. He said it was a most curious and interesting question, and that he was determined to satisfy himself by experiment. He left this neighbourhood immediately after; but I expect he is pursuing inquiries into the subject, as well as some other expert chemists. The contrivance for passing a quantity of vapour of water together with a blast, through highly ignited solid compact carbon, hitherto kept back through adverse circumstances, contemptible opposition, and intrigue, is destined to effect a revolution in some of the arts and manufactures. Some chemists even dispute the combination of the elements of water with carbon under the circumstances just stated.

But to return to the consideration of the properties of iron and cinder. I conceive that the redshortness of pure iron may be accounted for in this way:—When such iron is heated, the surface becomes oxidised; and being then hammered, the oxidised surface beat into the internal pure metal, its cohesion is destroyed, and the iron crumbles under the hammer; but if iron under the above circumstances is dusted over with some carbonaceous substance—as the dust of coal, coke, or charcoal—previously to being hammered, it will be found to work as well as the best working merchant bar-iron, because *carbo-oxide* has been supplied, which I am now fully convinced is the true welding principle. Although I am, at the same time, ready to admit that other circumstances may occasion the red-short property in iron, still I am satisfied that it is the constitution of the cinder, or alloy, in bar-iron which affects its quality, and causes its variable and different properties. I am led to believe that the great cause of the difference between Staffordshire and Welsh bar-iron is the coal used in puddling. The Staffordshire coal contains much more hydrogen than the Welsh coal—more carbon is, consequently, volatilised in the fire. Passing through the bed of the furnace, the hydrogen absorbs the bulk of the oxygen to form vapour of water, leaving a much greater proportion of free carbon in the atmosphere of the furnace to be deposited in the iron than there is in Wales; thus Staffordshire iron contains more cinder, or the cinder is more highly carbonized, than in Welsh iron. This renders the latter superior for railway bars; but inferior for the general purposes to which merchant bar-iron is applied. If nothing is interposed between the fibres of bar-iron, if it is altogether pure metal, and this possesses in itself the property of welding, there should be no appearance of fibres, grains, or crystals; but a smooth, uniform mass, similar to other metals. An opinion seems to prevail that the structure of iron, especially that of

the axes of railway carriages, undergoes a change by wear and tear—that the fibrous texture is converted into the crystalline. This appears to be an impossibility. When the fibrous texture has been imparted by repeating the operations of cutting up, piling, re-heating, and drawing out, the only change that can take place is the loosening of the fibres by the grinding of the cinder; and a moderate heating will make these adhere again. If a broken railway axle shows a crystalline fracture, the iron has been of the same structure from the beginning. Some manufacturers are of opinion that iron is superior when forged simply by hammering; and such iron will be found granulated or crystalline in its fracture, not fibrous.

If the correctness of my cinder theory were admitted, it would be easy to give an explanation of the two cases mentioned by Mr. S. W. Smith, in his letter of the 3d inst., which appears in the *Mining Journal* of the 8th; but rejecting it, I think it will be difficult to account, in a satisfactory manner, for the effects of the action of prussiate of potash upon bar-iron, as well as for the roasting of tap cinder (my carbide-oxide) of the puddling-furnace having the effect of enabling it to stand the heat, which otherwise it would not, when applied to line the furnaces in which the iron is puddled. As Mr. Smith may not be so sceptical as Messrs. Mushet and Mitchell, I take the liberty of submitting my mode of explaining the two actions for his consideration. I regard ordinary bar-iron as a mixture of fibres of pure iron and cinder, and the latter as a compound of iron, carbon, and oxygen. Prussiate of potash has an attraction for oxygen; when applied to hot bar-iron the cinder parts with oxygen; the surface of the bar, deprived of all oxygen, is then left as the hard compound of iron and carbon. When cinder is roasted, it parts with carbon, while the iron becomes highly oxidised; and this I consider, in the absence of earthy matters, or of carbon, as nearly infusible.

My attention having been drawn to the subject of prussiate of potash and its action upon bar-iron, has recalled to my mind an idea which occurred to me some time since—viz.: that the joint action of nitrogen and carbon, the elements of cyanogen, which is the base of prussic acid, has some influence in the formation of the peculiar form of iron known as pig-iron. It is remarkable that such can only be produced on a large scale from a blast-furnace. I know this remark will be met with this, that iron is obtained in that form when ores are reduced in a crucible. I think it would be difficult to prove that the little bit of iron got out of the bottom of a crucible was really pig-iron; it seems to me more likely that it is iron in its simple metallic state. My object in bringing forward this theory is to promote discussion.—T. H. LEIGHTON: Dec. 17.

MANUFACTURE OF IRON—MR. LEIGHTON.

Sir,—I fear there is too much of the guerilla in Mr. Leighton's mode of contest, to leave a hope that any solid impression will be made by continuing the discussion; in fact, he virtually surrenders his whole theory in the admission that cable bolts, which are certainly piled as often as any description of bars, and have afterwards to be forged and welded, require an iron pure from cinder. But as he has greatly misconceived my remarks, I must offer some explanations on my own account. I have nowhere asserted, as he supposes, that purity is the cause of redshortness in iron. I have not offered even a hint as to the cause of the redshort. I asserted merely a known fact, that redshort iron is almost universally cold-tough, without the least allusion to the cause of the coincidence. It does not depend on the purity of the process employed; for, if so, it would not be necessary to select for tin-plate pig-iron, known for yielding these qualities; any iron would do; which is so far from the fact, that coldshort iron still remains so after passing this purer and more expensive process. The next great misconception is to suppose me as asserting that purity, redshortness, and incapacity for welding are coincident. I have not stated anything so contrary to the fact as that pure iron, or redshort iron, will not weld. Redshort iron is that which fails at a red heat far below the point of temperature at which welding is performed. Redshort iron presents no deficiency in welding, rather otherwise. As to that wretched quality of iron which cannot hold together at a welding heat, it is happily scarce, and we will keep it so, if we can, by saying nothing about it.

As Mr. Leighton goes the surprising length of believing that the property of welding is not in the iron itself (which is equivalent to denying it any inherent tenacity, because, both in the puddling-furnace and the hollow fire, the malleable iron is gradually aggregated, or welded into lumps, from a state of absolute powder), and has stated in what it certainly does not consist, I will point out to him in what it probably does consist. If he takes two balls of clay, in which there is very little water, he will have great trouble in forcing the stiff compound into one consistent substance; but if they are thoroughly moistened, so as to loosen the texture of their surfaces, and make them approach nearer to a fluid state, the masses may be easily united together, and they will remain so after the water (corresponding to his cement) has been expelled to dryness. The particles of fluids are uniform, and therefore they have only to be brought together to enable them to cohere in a uniform mass. The absence of this mobility and uniformity in the particles of solids prevents any such facile adherence when they are brought together. But when any degree of liquefaction, either by heat or by other means, is induced, this irregularity is proportionately overcome; and, in that proportion, uniform contact and cohesion of the substances ensue.

Iron, therefore, to be welded, which is nothing more than inducing such intimate contact, is heated to as near fluidity as possible, without impairing its tenacity. In most other metals, the fusing point is so low that there is no sufficient interval between the heat thus softened and that which melts to permit of welding. Add to which that most metals, when heated to softness, lose all coherence, and become absolutely pulverulent under pressure. Iron, preserving its tenacity when softened to the very verge of fusion; and, therefore, be welded together, not cemented. From these considerations, it is not difficult to understand why the covering surfaces of iron to be welded with any substance which fuses into a vitreous coating, should assist the operation. When brought from the fire, the surfaces are exposed to the cooling influence of radiation, to the cooling contact of the air, and to oxidation from that contact, and this under a decreasing heat, which prevents the fusion of the oxide so formed. Scales of oxide thus created and unliquefied will not be expelled under the compression of the hammer, but will be worked in, irritating the contact. But if a vitreous coat covers the surface that leaves the fire, it is protected from these influences. The heat is retained under a shield closely fitting into the minute particles of the softened metal; these remain unoxidized, air which would effectually, by its elasticity, impair contact has no solid hollows to lodge in; and, by a physical necessity, the blows of the hammer expel and scatter this liquid, leaving the pure metallic particles, hot and soft, to close upon each other. In accordance with Mr. Leighton's view, the smith ought to work on at his welded iron as the temperature falls, and the cinder grows tough, in order to incorporate them. But he does just the reverse. The moment union is effected by the few first blows, he returns the iron to be reheated, fusing still more the cinder to be expelled, and softening the metal to perfect the cohesion.

In truth, Mr. Leighton seems to have founded his views very much upon misinformation, or actual ignorance of the compounds of iron. In a letter of the 3d March last, in your *Journal*, on this subject, he speaks of a transparent blast-furnace cinder being caused by the presence of oxide of iron, or other metal, and of a very transparent colourless cinder, being a pure silicate of iron. This is much the same as believing the clearness of a spring to have its rise from the quantity of mud in it, or that a brook sparkles like crystal from running past a dyer's. It is true oxide of lead produces with the earth a colourless glass; but try by experiment the effect of oxide of iron and other oxides, he will then appreciate the utter absurdity of these crude notions. There are some simple elements in every subject which ought to be known, and not trifled with, before theory and novelty is attempted. In the same letter, the colour of dark scouring cinder is attributed to carbon. It is true coal is black. Such mistakes, or misinformation, from it appears "the highest chemical authorities of the day," seem to be the foundation of Mr. Leighton's errors respecting "cinder." It is a common notion with workmen, and those ignorant of the chemistry of the manufacture, that its processes are purification, and all the waste impurity. The old bloomy men, where that process yet survives, regard the wasted oxide as impurity, and the iron which escapes, to be revived by the destructive process, as all that is worth having. If Mr. Leighton has been told that all the waste in bar-iron making is a silicate of iron, which has to be purified out of the metal, he might well be startled at the fact that there remains nearly as much silica at the end as at the beginning. This impurity, as it is called, is neither more nor less than fused oxide of iron, generated by the high temperature to which the iron is necessarily exposed—it is, in fact, a fruit of the imperfection, not the perfection, of the processes. If the iron, during the operation, comes in contact with the earth, especially silica, which has a strong affinity for its oxide, a greater or less proportion will be found united in the fused

oxide; thus the cinder of the puddling-furnace, to which he particularly alludes, will contain more silica if puddled on a sand than on an iron bottom. A part of the iron is oxidized, and scattered in fused globules from the common smith's anvil; but no one calls this a purifying operation. Unable to account for this unceasing flow of silicate of iron from the bowels of the metal, no doubt a perplexing phenomenon, Mr. Leighton has hit on the notion of substituting graphite for silica in the compound—a suggestion, however, which is equally unnecessary, and much more untrue. There can be no objection to Mr. Leighton having each article in one solid fibre, if he can accomplish it. Whatever be the intention of using the refinery, I must repeat, that if the effect be to promote the cinderly adjunct, the constant use of the refinery by the tin-plate makers cuts with a double edge against each of his suppositions. The bar-iron, puddled direct from the blast-furnace, which I alluded to for its excellence of quality, is not puddled with cinder.—DAVID MUSHET: Dec. 12.

CHEMICAL STRUCTURE OF IRON.

Sir,—I appreciate the dexterity with which Mr. Radley, Ch. E., has appropriated Mr. David Mushet's explanation of the fibre in bar-iron. By enclosing it in aposeuroses, he has bagged it for his own. How much is it to be regretted that he alone had not described it, *ab initio*, imparting his own lucidity—his lumino-phrasological texture. Mr. Radley is a critic in philology. Will he permit me to explain the etymology of the word "toffee"? Immersed in Greek, he may have overlooked our vernacular. In agrarian districts, it is not unmetedious to pronounce the word "toff" "toff"—may, in provincial manuscripts, I have absolutely ocularized this word orthographically, as "toff" and "toffy," plainly showing that, in attic dialect, the *apose* is "toughy," and not "toffee." Also, "dough" is, in ordinary parlance, corrupted both in its orthography and elocution, being truly identical with "tough," indicating a substance with toughness and tenacity. I am sure Mr. Radley will excuse these hints; his penetration will perceive their immediate connection with the rolling of iron. Will Mr. Radley publicise the quantum of fibrin and gluten elementated by his analyses from bars of the volvent mill; or is the latter substance the true gelatin? Has osmazome been detected, or other substances required to complete the analogy of the forge to the animal economy? How entertaining now becomes the simile of our far-seeing Shakespeare—"Sighing like a furnace!" Has Mr. Radley fully ascertained the form of the fibres to be, as he asserts, the "cellulo-cylindroid," and not the sharper polygono-squeezoid? Mr. Radley lately offered his opinion on the dispute between Mr. Stephenson and Mr. McConnell, as to the crystallizing of bar iron by vibration. Has he discovered what change is induced upon the aposeuroses on the transition of longitudinal fibre to crystalline facets? Are they absolutely delicated, or do they receive a latero-elongation? In the latter case, the bars would thicken and shorten as the crystals increased in diameter—a fact that requires to be noted.

I incline to the belief that the sheaths resemble the periosteum more than the aposeuroses. Has Mr. Radley investigated if that obstruction of the ascending or descending aorta of the blast-furnace, vulgarly called "scaffolding," proceeds from malformation of the maxillary process at its mouth, or is connected with the nasal and thyroid appendages of the respiratory organs beneath? In the latter case is there a strict analogy between that occasional form of them at the back tyre—hight the "breaches-boy"—and the inferior furcations of the trachea?—or is it a true anastomosis of the air-vessels connecting the side pipes with the centre of combustion, or the spleen elucidating its hitherto mysterious functions? Can he likewise predicate and expound if phosphate of lime bears the same function in the osteology of the ferric system as has been hyperphrased in the epetology of vital organisms? Does "steel to the backbone" imply that there is a back-bone in steel? Mr. Radley will be gratified to hear that the "amusement" is mutual, and on my part constant. Has he any of the tap cinder, and is he thermo-dissolvent to vend it, which is as elastic as caoutchouc at a welding heat?—FERREUS: Dec. 17.

CARBON AND IRON.

Sir,—Mr. Bagges mentions the experiment of C. Clouet, supposed to have resulted in the production of cast-steel through the agency of carbonate of lime. Will he permit me to refer him, in the *Papers on Iron and Steel* to the experiment of my father to verify that assumption. After repeated and careful experiments completely performed, it did not appear that carbonate of lime possessed the slightest power of communicating carbon to iron, but rather the reverse. It appeared the Frenchman had been too vivacious in their conclusions, misled by the novelty of a button of cast malleable iron, to suppose that it was cast steel. Cast malleable iron, from the high temperature required to fuse it, was then comparatively unknown. It is satisfactory to me to find Mr. Mitchell is entirely coinciding with the views I expressed in your *Journal* of the 27th of October, on the cementation of steel, and I am greatly pleased that he has taken up my proposed experiment. If the result accords with the theory, it will at least throw this light on the formation of graphite, that it is carbon which has crystallised, after taking the form of vapour in carbonic oxide. A kindred point will then be to ascertain if iron saturated by means of carburized hydrogen also yields graphite. The course of these experiments may lead to peculiar results on the transitions of carbon to its purest known condition in the diamond. Under these views, graphite may be regarded as distilled carbon, condensed and developed by a reaction of iron saturated with it, and thus freed from those salts which more or less contaminate it in its usual forms. Further investigation may trace steps leading to yet purer results.—DAVID MUSHET: Dec. 12.

THE HOT-AIR ENGINE V. STEAM.

Sir,—It is to be regretted that Mr. Craddock did not state his objections to my improved air-engine before our recent discussion upon the subject was brought to a close. It is a waste, both of time and space, to pass again and again over the same ground. Mr. Craddock's letter is almost identical in substance with that of Mr. Weston, which appeared in your columns a few weeks since, and his object also is clearly the same—viz., to place in striking contrast the great merits of his own invention with the manifest deficiencies of mine. Such being the case, I will take the liberty of referring your correspondent to my reply upon that occasion in the *Mining Journal* of Nov. 10th. With regard to Mr. Craddock's computation of the relative value of air and steam, as economical agents for producing motive power, I can say nothing. I have not examined its accuracy, seeing that my calculation upon the same subject has not been disputed in detail; and to substitute one question for another, whether arithmetical or otherwise, appears to me, to say the least of it, to be rather an Irish method of conducting an argument. As the letter, however, to which I have just referred, does not comprehend every particular point touched upon in Mr. Craddock's epistle, I will here say a word or two in addition. The writer remarks, in the first place, that "to generate a force equal to 15 lbs. per square inch in the air will require its temperature to be raised to 550°; therefore [he says], one thing seems certain, which is, that if the water in the vessel the air passes through on its way to the working cylinder should attain the same—namely, 550°—Mr. Bagges would surpass us all in high-pressure steam, as, in such case, it would be above 1000 lbs. pressure per square inch." This is a very strange and tortuous conclusion to arrive at! Is the temperature of steam, then, a constant and unalterable index to its elastic force? Your correspondent appears to consider so, for he has given me credit for employing in the engine alluded to, a steam force of nearly 1000 lbs. to the inch, and this for no other reason than because I employ a temperature for the air of 550°. If steam is to preponderate to such an enormous extent as this, why call the invention an air-engine at all?

But I will go a little farther. Setting my intended application quite out of the question, and looking at the matter in the abstract merely, I shall be very much obliged to Mr. Craddock if he will show me in what way he can generate a pressure of 1000 lbs. to the inch, by simply passing hot air through water, or steam, or both, combined in the manner mentioned. I will not limit the temperature of the air to 550°. It may be 1000°, or 2000°, or 3000°, if he thinks fit. To produce such a pressure, under such circumstances, is an impossibility. But, perhaps, your correspondent supposes the water itself to be heated to 550°—that is, *per se*, and independent of any caloric derivable from the air. If this is his supposition, on what basis does it rest? and what are his reasons especially for attempting to saddle it upon me, even by inference? If Mr. Craddock will be at the pains to inquire into the real details of this engine, as given in the past numbers of your *Journal*—if he will investigate its general arrangement and rationale with that care and disinterested feeling which, in common justice, should be expected from a critical reviewer; he will find that the steam in the reservoir through which the air passes on its road to the cylinder is partly produced by the redundant, and otherwise injurious,

caloric of the hot air, and partly from the waste products of combustion after they have exerted their utmost energy in giving motive force to the imprisoned air. Now, it is rather a remarkable circumstance that this very arrangement, combining the joint use of hot air and steam, has been tried upon a fair practical scale, subsequent to the date of my patent, and with remarkable success in point of economy; but because my invention happens to be in the same condition with Mr. Craddock's, and that "mankind will not yet receive the advantages it would confer upon them," he wonders at my "exaggerated estimate" of the capabilities of air, and says that "it savours more of boldness than of practical experience to say" what, indeed, I have said, but what he has garbled and misquoted. That this quality of boldness, however, forms no striking trait in his own character, is rendered sufficiently evident by the terminating sentence of his letter, wherein he modestly informs us that, by the adoption of his patent improvements in steam-engines, a matter of no less than "twenty millions of pounds sterling would be annually saved to this country." Whether this saving is to be mainly effected by surface condensation through the refrigerating influence of cold air, or by a more extended application of Hornblower's double cylinder, with a slight deviation from axial parallelism in the two cylinders, does not clearly appear. It is manifest, however, from what is stated, that one great feature of improvement consists in employing steam of a very high pressure—200 lbs. to the inch; and we are assured that, when generated under these circumstances, it is far more safe and docile than under the present low pressure system.

We see occasional proof of this increased docility in the reports of those fearful explosions which are continually taking place upon the North American rivers, where steam is used much higher than in England—150 lbs. to the inch; sometimes even 150 lbs., to enable a vessel to pass parts of a river where there is a strong current; but never beyond this, except indeed on very extraordinary occasions. With this pressure, according to Mr. Stevenson, "the volume of steam discharged from the escape-pipe at every half stroke of the engine, makes a sharp sound, almost like the discharge of fire-arms; while every timber in the vessel seems to tremble, and the whole structure groans under the shocks." It is probable, however, that Mr. Craddock might lessen some of these evils, if he could not remove them, though the mere act of condensing the steam would only tend to conceal the existence of danger.

His plans may be good, and I honestly wish him success; but he may rest assured that success will not be advanced by any institution of ill-grounded and prejudiced comparisons. Considering also the extensive manufacturing facilities at his command, and that he has been unceasingly employed upon the improvement of the steam-engine since the year 1840, and more especially during the last three or four years, I may, perhaps, after what has been said, be permitted to wonder why it is that the many judicious and practical men who have doubtless seen his engines in operation have failed to recognise their special efficiency, and to avail themselves of those advantages which the inventor professes to place at their disposal.—ISRAEL BAGGES: December 19.

PEAT CHARCOAL.

Sir,—Mr. Rogers is very much mistaken, if he believes I have in any-wise underrated the merits of his peat charcoal; all I have done is to view its merits in a proper light. Charcoal, properly so called, from whatever source derived, is indestructible, and has ever been so considered by the chemists. Carbon, in combination, may be soluble, as in the form of carbonic acid gas, and thus be appropriated and assimilated by the plant.

The value of peat charcoal, in reference to vegetation, will mainly, if not entirely, I apprehend, depend on its absorbent character and capacity, becoming, as it were, a treasury of volatile products, which might otherwise be lost, and slowly yielding these to the roots of plants, under a change of circumstances, as of heat and moisture. Its resolution in the course of years into any combination of carbon, to be directly appropriated as the food of plants, is of a more questionable character. Peat charcoal may also, in its antiseptic character, counteract the agencies of decay in soils, and which might otherwise affect the roots. It will thus be seen I by no means depreciate the merits of peat charcoal, as far as agriculture is concerned.

I do not affect to comprehend what Mr. Rogers would have implied in the term "kill," as applied to his peat charcoal; but, by a disinfectant is clearly to be understood that which affects the destruction, or extinction, of the noxious principle, either by resolving it into innocuous elements, or forming therewith an inert compound. I call chlorine and nitrous acid true disinfectants. They decompose, and by decomposition, destroy that deadly septic poison, sulphuretted hydrogen, &c.; also arseniated hydrogen, hydrocyanic acid, &c. For the rest, analogy must be our guide; and it is a legitimate one, where the elements at work are more subtle and intangible, as in malaria, or miasms.

That which quenches and renders noxious effluvia, or fetid smells, *inodorous*, may not be a disinfectant, because the infectious principle, epidemic or endemic, may be intangible, or inappreciable, to the sense of smell; and, therefore, the agency of a deodoriser is no proof that it has acted as a disinfectant.

Peat charcoal, especially if fresh prepared, is most valuable as an auxiliary in sanitary arrangements, acting as a powerful absorbent of fetid and noxious volatile products, and condensing and retaining them; and I must confess I would very much prefer Mr. Rogers's peat charcoal for such purposes to Mr. Ellermann's "deodorant." I think the comparative trials made at Stourbridge entirely conclusive. J. MURRAY.

Portland-place, Hull, Dec. 20.

ADULTERATION OF BREAD.

Sir,—Mr. Mitchell's charge of fraud, in last week's *Mining Journal*, on the above subject, demands further notice, and the great importance to both the public and the bakers in particular, must plead my excuse for asking the favour to give this a place in your next Number. Mr. Mitchell says, the use of potatoes in making bread is a fraud, because it displaces so much flour, and the public have to pay for water instead. The words in your "Notice to Correspondents" on the 7th, as the spirit of my letter, do not convey my meaning; what I intended is this—take any two quantities of flour exactly alike (say 280 lbs. each); make one up in the usual way, genuine; to the other add 40 lbs. potatoes, and prepare it as the baker is forced now to do; bake both exactly the same time at the same temperature, and, when weighed, the bread to which 40 lbs. had been added will not weigh one pound more than that from the pure flour—therefore, the use of potatoes is a dead loss to the baker; they are only used to assist in the fermentation, and not for any additional weight they can give. This may be easily proved by any one. Mr. Mitchell comes forward as a scientific man, and as such we might expect he would make himself well acquainted with the subject before venturing an opinion, much less prefer an open charge against a large class of tradesmen; but as he shows himself ignorant of the real facts of the case, his sentiments on other ingredients, said to be used in the same article, cannot be of much value. As to his 10 per cent. of chalk, or gypsum, there is evidently an error; for, content, and there are plenty willing to enter the lists with Mr. Mitchell and prove him wrong, that 5 per cent. of either chalk, gypsum, bone dust, or alum, cannot be used for making bread without spoiling the whole of the flour employed. There is no article of human food less adulterated than bread, and no class of tradesmen more vilified than the bakers, while none deserve it less. Competition alone secures to the public a good article, as there is no ingredient at the present price of flour that they can possibly use profitably to add to its weight and their profits. I believe there is no class of trades whose per centage of gain is so low as the bakers.

Southwark, Dec. 16.

HENRY SMITH.

GLASS REFLECTORS.

Sir,—Perceiving in your publication of last Saturday a statement relative to the recent importation of glass reflectors from France, I venture to trespass on your attention, for the purpose of inquiring if any of your numerous readers can give information as to the mode of manufacturing them, and where they can be procured. WILLIAM LEE.

Doctors' Commons, Dec. 20.

IMPROVED MACHINERY FOR WIRE ROPES.—J. A. Roebing, of Pennsylvania, has patented some improvement in wire rope spinning, in which he claims a conical tap, with two or more circles of notches, which vary in extent and depth, so as to suit the passage of the different circles of wires, which are to compose a compound strand, and the application of one or more rings or bands, for the purpose of keeping the different circles of wires apart, as well as to keep the wires separate among themselves.

At the anniversary meeting of the Royal Society, on St. Andrew's day, the President, Lord Rosse, presented the Copley gold medal to Sir Roderick I. Murchison. This is the highest honour that an Englishman of science can attain; since the prize is open to all Europe; and Sir Roderick is the first geologist who has had it within a period of 27 years.

